

CLIMATE INVESTMENT FUNDS

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CLEAN TECHNOLOGY FUND INVESTMENT PLAN FOR PHILIPPINES

Clean Technology Fund Investment Plan for the Philippines

Executive Summary

Introduction

1. This Clean Technology Fund Investment Plan for the Philippines proposes CTF co-financing of \$250 million to support Philippines' efforts to transform the energy sector through scaled-up distributed generation with renewable energy resources to match the country's archipelago configuration and address transmission constraints through demand side management. The Investment Plan will also implement the Government's National Environmentally Sustainable Transport Strategy (NESTS), which aims to reduce energy consumption in the transport sector. Specifically, the Investment Plan proposes CTF co-financing for (i) catalyzing private sector investment in distributed generation through renewable resources and increasing the number of viable off-takers (Electric Cooperatives) for such renewable energy (RE); (ii) investment support and risk mitigation for the private sector's entry into energy efficiency and cleaner production sectors; (iii) solar generation with net metering; and, (iv) introduction of Bus Rapid Systems in Cebu and Metro Manila. The CTF investments will mobilize financing of about \$2.5 billion from the government, multilateral development banks, carbon finance and the private sector.

Country and Sector Context

2. The Philippines is the world's second largest archipelago. Although the economy has performed reasonably well in the past several years, poverty incidence has increased from 30 to 33 percent between 2003 and 2006. It is therefore the aim of the Government of the Philippines to include poverty alleviation as one of the outcomes of the CTF Investment Plan.

3. Growth in energy use and the associated greenhouse gas emissions have accompanied the economic expansion seen after the recovery from the Asian financial crisis. About 56 percent of the Philippines energy demand is met by indigenous resources including coal, natural gas, hydropower and traditional biomass energy. The Philippines is one of few countries in the world where renewable energy (RE) accounts for the largest share (43 percent) of total primary energy supply. However, starting in 2002, there has been increasing use of natural gas for power generation. Likewise, the share of coal to total primary energy supply has risen from five percent in 1990 to 16 percent in 2007. Some estimates show that under a business as usual scenario, 50 percent of installed generation capacity by 2030 will be accounted for by coal.

4. In terms of overall greenhouse gas (GHGs) emissions, the Philippines is ranked 39th in the world in 2005 with about 142 million tons of carbon dioxide equivalent (MtCO_{2e}), excluding emissions due to land use change.¹ CO₂ emissions from fossil fuel doubled between 1996 and 2006. Principal GHG emissions sources are the power and transport sectors. The transport sector's contribution to GHG emissions in the Philippines has increased significantly both in absolute and relative terms since 1990. CO₂ emissions associated with the transport sector have

¹ Climate Analysis Indicators Tool (CAIT) Version 6.0. (Washington, DC: World Resources Institute, 2009).

had annual increases of about 6-10 percent.² Of additional concern to the government is the more than doubling of the relative share of transport in CO₂ emissions from about 15 percent of total emissions (excluding those from land use and forestry) in 1990 to about one third today.

5. Based on the current growth rates in motorization of about 6 percent, and the projected increase in urban population by 35 million by 2030,³ emission contributions from road transport, estimated at 24 MtCO₂e in 2007, are projected to increase to 37 and 87 MtCO₂e by 2015 and 2030, respectively, under a business as usual (BAU) scenario. This would not only result in a rapid increase in the country's carbon footprint, but would further exacerbate air quality, and increase the already high levels of congestion leading to significant losses in productivity.⁴

Priority Sectors for GHG Abatement

6. The Philippine energy road map, endorsed by the President in 2008, recognizes that technology and modal shifts can be implemented to mitigate power and transport sector emissions growth in the near future with a strong effort to address renewable energy development, transmission and distribution system optimization, transport fuels, vehicle technology, infrastructure, and behavioral changes.

7. In an effort to further reduce the country's carbon footprint and improve local air quality, President Gloria Macapagal-Arroyo instructed the Department of Transportation and Communications (DOTC) and other transport-related agencies to formulate a National Environmentally Sustainable Transport Strategy (NESTS) for the country. NESTS will promote, among others, the development of Bus Rapid Transit (BRT) systems, expansion of the urban rail network in Metro Manila, deployment of hybrid vehicles in the public transport fleet, and acceleration of fuel-switching in certain public transport modes. NESTS will set outcomes and indicators in several areas including: (i) air quality and public health; (ii) vehicle emission control, inspection and maintenance; (iii) clean(er) fuels; (iv) public transport planning and travel demand management; (v) non-motorized transport; (vi) land use planning; (vii) road safety; (viii) social equity and gender.

8. The Government of Philippines has also outlined ambitious objectives for RE development:

- (i) Increase RE based capacity by 100 percent in ten years;
- (ii) Be the number one geothermal energy producer in the world;

² Six MtCO₂e is based on the World Resources Institute's estimates, while 10 MtCO₂e is based on the 2006 IPCC guidelines for estimating fuel emissions.

³ Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2007 Revision, <http://esa.un.org/unup>.

⁴ A study prepared by the National Center for Transportation Studies for NEDA and the Legislative-Executive Development Advisory Council in 2000 indicated that losses due to congestion in Metro Manila alone were around 100 billion Pesos per year in 1996 prices, about 4.6 percent of GDP.

- (iii) Be the number one wind energy producer in Southeast Asia;
- (iv) Double hydro capacity with additional 3,000 MW;
- (v) Be the solar cell manufacturing hub in ASEAN; and
- (vi) New contribution from biomass, solar, and ocean energy by more than 100 MW.

9. The World Bank (2009) evaluated two alternative scenarios for low carbon development, referred to as the medium and aggressive (low-carbon) scenarios. The power sector study's medium scenario aimed for modest reductions targeting 10 percent energy efficiency (EE) across all sectors and doubling RE by 2030. The low-carbon scenario shows an aggressive low-carbon path-way, pushing intensive wind power and solar PV RE generation and 15 percent lowering of demand due to EE, resulting in emission levels at just 30 percent of the BAU level in 2030 (see Figure 8). By 2030, installed RE capacity under the aggressive low-carbon scenario will reach 17GW, a three-fold increase from the baseline scenario. The main differences between the two scenarios in transport lies in meeting desired targets earlier as well as in scaling up faster under the low carbon scenario.

10. For the power sector, energy efficiency programs present a huge potential for mitigation with negative abatement cost. On the supply side, fuel switching from coal to natural gas, hydro and wind present large mitigation potential at an incremental cost of less than US\$50/tCO_{2e}, with wind power providing the highest mitigation potential. Transport sector emissions in the low carbon scenario are 62 percent less compared with the BAU level in 2030, due to the use of mass transit systems, traffic demand management schemes, vehicle efficiency measures and a higher mix of biofuels.

Rationale for Selected Sectors for CTF Co-Financing

11. Based on the trends in emission growth, policy conditions affecting primary energy supply and demand, and estimated abatement costs, the GHG reduction priorities are in the electric power and transport sectors which account for about 64 percent of total energy CO₂ emissions. The NEDA Board's Cabinet-level Infrastructure Committee has endorsed an ambitious CTF Investment Plan that focuses its interventions on the foundations for a transformation of the energy sector in a way that will promote:

- ***Distributed Generation through Renewable Resources.*** This will be done by scaling-up of private sector renewable energy power generation, which is currently not viable for developers due to the high cost of renewables. Large-scale power producers will require equity and/or risk mitigation measures. Smaller and medium-sized developers will require long term debt, credit enhancement, and project development facilities.
- ***Energy Efficiency through Demand Side Management.*** In order to enlarge the market for renewable power, CTF co-financing will seek to improve the creditworthiness of an increased number of power off-takers (i.e., the Electric Cooperatives). The investments will address transmission constraints (particularly those faced in the Visayas and Mindanao regions) and develop Demand Side Management (smart grid, demand side

management) to improve their viability, as well as extend credit enhancement measures to the ECs.

- **Promote solar power generation.** CTF funds will be used to cover part of the additional cost of solar power generation through large-scale implementation of the net metering program, which is a pioneering framework under the new Philippines RE Law. The net metering scheme will allow consumers the option to generate their own power and sell excess power to the grid. The CTF co-financed program will reduce the time needed to have 30,000 solar generation installations in commercial buildings from 10 to about 2 years, by reducing the initial capital cost with a large single procurement through international bidding and providing additional tariff support above the regulatory feed-in tariff for the first three years.

12. In addition, the transport investments proposed are BRT systems in Metro Manila and Cebu. BRT systems are among the most cost-effective public transport systems in the world. A BRT is a mass transit system that mimics the speed and performance of metros or light rail transit (LRT) but uses buses rather than rail vehicles. As such, BRT combines the reliability of rail and the versatility of conventional bus systems at a fraction of the cost of rail. While the development of BRT systems will result in significant reductions in GHG emissions, the introduction of biofuels will have a significantly higher impact (as presented in the previous section). Nevertheless, BRT is being targeted for two main reasons: (1) the program of biofuels is ongoing and progressing well; and (2) the economic development impacts of the BRT, particularly for the poor, are substantial.

13. *Potential for GHG reduction:* GHG emissions savings from the RE and EE investments are expected to reach 3 million tons of CO₂e/year. The solar power investment will result in more than 100,000 tons of CO₂ savings per year. The proposed BRT interventions are estimated to reduce GHG emissions by about 0.6-0.8 Mt CO₂e/y.

14. *Demonstration potential:* The proposed renewable energy interventions would change the structure of electricity generation into one where RE will be an established form of distributed generation. The displacement of the equivalent 450-600 MW of installed coal capacity a year show a high potential for replication to support the government's target of reducing coal reliance equivalent to 5,000 MW installed capacity. The solar power component could be scaled-up to 300,000 customers (a ten-fold increase) as prices fall and the market transforms, with significant GHG emissions savings.

15. The BRTs systems envisioned for the Philippines have the cumulative GHG emissions abatement potential of about 2-3 Mt CO₂e/y. However, the proposed investments could lead to more BRTs than is currently envisioned as other cities start to recognize their benefits. Emerging metropolitan areas such as Metro Davao, Naga, Bacolod, Iloilo and Cagayan de Oro have been identified as potential sites for BRT project implementation.

16. *Development impact:* There is a strong development impact of the RE program as most of the geographic areas where investments will be mobilized are also home to poverty stricken communities. The proposed energy program also creates a strong link between encouragement of investments in RE power generation and the development of creditworthy off-takers in the

electric cooperatives tasked to distribute electricity to rural communities. Similarly, the solar program could be a strong market opportunity for small and medium enterprises.

17. BRTs are expected to have significant development impacts in terms of environmental benefits, reduced traffic congestion, improved traffic safety, potential reduction in travel times, and transport cost savings accruing to end users. The magnitude of the benefits and their share to low income groups will be significantly higher when BRTs are well integrated with public transport systems.

18. *Implementation Potential:* GOP energy policy emphasizes private sector development and investment, with independent regulation. Fuel subsidies have been largely phased out. The Renewable Energy Act of 2008 (the RE Act) was approved and became effective in January 2009. The implementing rules and regulations were approved in July 2009. The RE Act provides for a variety of fiscal incentives and regulatory measures including:

- A Renewable Portfolio Standard (RPS) mandating a certain share of power to be provided by renewable energy;
- Feed-in tariffs;
- Net metering for qualified end-users;
- Establishment of a RE Trust Fund; and
- Tax holidays and exemptions.

19. The government has demonstrated a strong record in implementing low carbon transport interventions particularly in urban rail and bus networks and implementation capacity is relatively high due to private sector participation in public transport and vehicle technology development.

20. *Additional costs/risk premium:* CTF financing is necessary to provide appropriate financing and risk mitigations for local financial institutions to support the private sector's entry into RE/EE/CP sector. Many companies involved in the development of RE, EE, and CP have found it difficult to access local funding support in order to make investments in such projects. CTF financing could fill the financing gaps that block first-movers and provide sufficient returns to pioneer projects. Furthermore, the poor creditworthiness of a significant portion of Electric Cooperatives, who would be the primary off-takers of renewable energy, creates a risk for RE investors. CTF co-financing is proposed to support the transformation of an increased number of ECs so that they can be financially viable counterparts for RE investors.

21. Currently, the specialized electronic meters for net metering and solar panels are not readily available in the retail market in the Philippines, and are controlled by a small number of technology vendors and service providers. A large scale project will bring in more players and choices to the market. The regulated feed-in tariff currently provides a payback period of about ten years; with bulk purchase, payback could decline to 7.5 years; adding a CTF-supported incentive could reduce it to 2.5 years, significantly accelerating the market.

22. The lack of knowledge in the Philippines of BRT systems coupled with the familiarity with the more expensive LRT has impeded the development of BRTs. In addition, while the economics of BRT projects are generally robust, with large benefits accruing to the lower income groups, a certain level of financial support is often necessary for reasons of affordability to launch BRTs. Carbon finance has not played much of a role in the transport sector.⁵

22. CTF support to the proposed BRT projects is critical as these projects well demonstrate at scale the sound principles for design and integration of BRTs into the public transport system. Several BRT initiatives worldwide have failed because they were neither designed nor implemented adequately, and merely treated as regular buses operating on separate lanes. These failures make it much harder to reconsider BRT initiatives in the future. This is all the more important in the case of the Philippines where GoP has been considering BRT projects for the past 10 years but is yet to implement one. CTF financing is also expected to result in an enhanced design and accelerated implementation of several BRT systems.

⁵ The “mobile” nature of transport vehicles makes it difficult to isolate reductions in carbon emissions in a corridor that could have resulted from a transport improvement.

Table 1: Investment Plan Results Indicators

Indicators	Baseline	Investment Program Results
New installed RE-based power generation capacity by 2020	340 MW	100-150 MW of equivalent installed coal capacity displaced by EE interventions by 2020 300-450 MW of installed coal capacity displaced by investments in RE-based generation by 2020
Estimated annual GHG emissions reduction	0 MtCO ₂ e/year	3 MtCO ₂ e/year
Rapid replication potential towards government goal to move from baseline to medium scenario (e.g. from 5,500 MW to 7,750 MW of installed RE-based generation by 2030)	Zero additional RE-based generation capacity from baseline scenario	Investments in RE & EE would result in displacing 450-600 MW equivalent coal installed capacity. It would jumpstart efforts to reach additional 2,250 MW installed RE-based generation capacity under the medium scenario
Cost of solar power units	\$18,000 with 9.8 years payback	\$10,000 with 2.5 years payback
Number of commercial buildings with solar panels and net metering	Limited	30,000
New BRT systems operating	0	2 BRT systems (Cebu and Metro Manila). GHG emissions savings of 0.6-0.8 Mt CO ₂ e/year

Table 2: Program Financing (US\$ million)

Financing Source	Renewable Energy (WBG)	Urban Transport (WBG)	RE and EE (ADB)	TOTAL
CTF	75	50	125	250
GOP/DBP	180	50	50	280
IBRD	250	250		500
IFC	250			250
ADB			400	400
Others	750		350	1,100
TOTAL	1,505	350	925	2,780

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank	LRT	Light rail transit
AO	Administrative Order	MFF	Multitranches financing facility
APEC	Asia-Pacific Economic Cooperation	m ²	Square meter
ASEAN	Association of Southeast Asian Nations	MMBFOE	Million Barrels of Foreign Oil Equivalent
AusAID	Australian Government Overseas Aid Program	MRT	Mass rapid transit
BAU	Business as usual	Mt	Million tons
BRT	Bus rapid transit	MtCO _{2e}	Million tons of carbon dioxide equivalent
CFL	Compact fluorescent lamp	MTOE	Million tons of oil equivalent
CIP	Country Investment Plan	MW	Megawatt
CME	Coconut methyl ester	MWh	Megawatt-hour
CNG	Compressed natural gas	NEDA	National Economic and Development Authority (Philippines)
CO ₂	Carbon dioxide	NEECP	National Energy Efficiency and Conservation Program
CO _{2e} /y	Carbon dioxide equivalent per year	NESTS	National Environmentally Sustainable Transport Strategy
CP	Cleaner Production	NREL	National Renewable Energy Laboratory (U.S.)
CTF	Clean Technology Fund	NTP	National Transport Plan
DOE	Department of Energy	NTPF	National Transport Policy Framework
DOTC	Department of Transportation and Communications	PEEP	Philippine Energy Efficiency Project
DBP	Development Bank of the Philippines	PEGR	Partnership for Economic Governance Reform (AusAID)
DSM	Demand-side management	PELMATP	Philippine Efficient Lighting Market Transformation Project
EC	Electric cooperative	PEP	Philippine Energy Plan
EE	Energy efficiency	PV	Photovoltaic
EPIRA	Electric Power Industry Reform Act	RA	Republic Act
ESCO	Energy service company	RE	Renewable energy
FIRR	Financial internal rate of return	REC	Renewable Energy Certificate
GDP	Gross domestic product	RPS	Renewable Portfolio Standard
GEF	Global Environment Facility	SPUG	Small Power Utilities Group
GHG	Greenhouse gas	TA	Technical assistance
GOP	Government of the Philippines	tCO _{2e}	Tons of carbon dioxide equivalent
HRIP	Heat Rate Improvement Program	UNDP	United Nations Development Programme
IBRD	International Bank for Reconstruction and Development	UNFCCC	United Nations Framework Convention on Climate Change
IFC	International Finance Corporation	USAID	U.S. Agency for International Development
IPCC	Intergovernmental Panel on Climate Change	WWF	World Wildlife Fund
JICA	Japan International Cooperation Agency		
Km	Kilometer		
kW	Kilowatt		
kWh	Kilowatt-hour		
LGU	Local Government Unit		
LGUGC	Local Government Unit Guarantee Corporation		

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I. INTRODUCTION

1. The Clean Technology Fund (CTF) Country Investment Plan (CIP) is a proposal for the use of CTF resources in the Philippines. It includes a potential pipeline of projects and a notional resource envelope. The CIP is a “business plan” developed by the Government of the Philippines (GOP) in agreement with the Asian Development Bank (ADB), the International Bank for Reconstruction and Development (IBRD), and the International Finance Corporation (IFC).

2. The CIP is based on the country’s Medium-Term Philippine Development Plan 2004–2010; and the Comprehensive Integrated Infrastructure Program (CIIP) 2009–2013; the Philippine Energy Plan (PEP) 2008–2030; the Climate Change: Philippine Response, Strategic Framework and Action Plan (2007); the National Environmentally Sustainable Transport Strategy (NESTS); and other relevant sector development policies and programs. This CTF investment plan is a dynamic document that is based on the economic development plans, the GOP investment programs, and mature project proposals currently being considered. This CIP is consistent with, and will be an integral part of, the programs of the ADB, IBRD, and IFC.

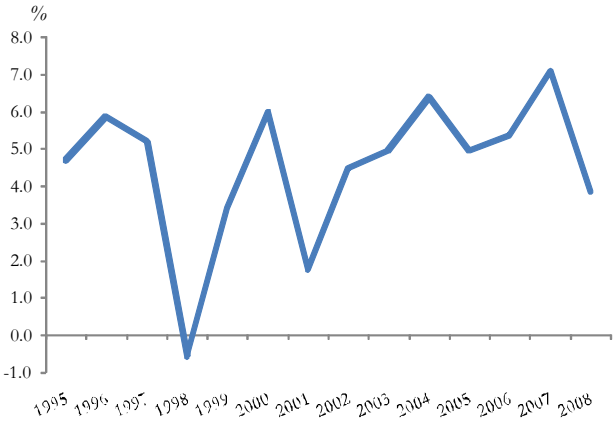
II. COUNTRY AND SECTOR CONTEXT

3. The important development objectives of the GOP are elucidated in the Medium-Term Philippine Development Plan 2004–2010, which includes targets for high levels of pro-poor sustainable growth and achieving the Millennium Development Goals.

4. The Philippines is the world’s second largest archipelago with a diverse population of 89 million. It is reasonably well endowed with natural resources, including copper, gold, nickel, timber, and marine biodiversity. There are limited commercial reserves of fossil fuel, mainly natural gas and coal, but commercial-scale geothermal energy and hydropower resources are currently being harnessed to meet the country’s power needs.

5. The country experienced economic contraction in 1998 in the aftermath of the Asian financial crisis. The economy has performed reasonably well in the past several years. The year 2007 ended with the highest economic growth in decades, benign inflation, a strong balance of payments position, and an improving public sector fiscal situation. However, this strong performance has not translated into poverty reduction. Between 2003 and 2006, the incidence of poverty increased from 30 percent to 33 percent despite average gross domestic product (GDP) growth of 5.4 percent. Both urban and rural poverty increased on average, and only 4 of the 17 regions recorded improvement in the poverty headcount. Falling real incomes of families and compression of public spending

Figure 1: GDP Growth



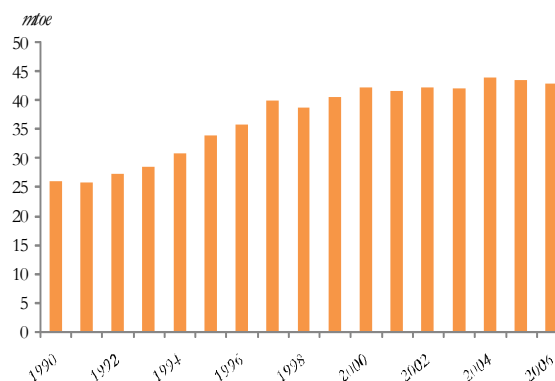
contributed to the rise in poverty. There is mixed progress in achieving the Millennium Development Goals. It is therefore the aim of the GOP to include poverty alleviation as one of the outcomes of the CTF assistance.

6. As substantial investments in infrastructure are needed, the GOP has sought joint initiatives with the private sector with total investments estimated at US\$5.6 billion under the Comprehensive Integrated Infrastructure Program 2009–2013. Reforms, including improved investment climate and a more robust financial sector, are being pursued in order to encourage private sector participation. The GOP has fully realized that it needs to boost its development spending to attain the Millennium Development Goals by 2015 and is implementing a resiliency program to counter the economic downturn.

7. Growth in energy use and the associated greenhouse gas (GHG) emissions have accompanied the economic expansion seen after the recovery from the Asian financial crisis (see Figures 1, 2, and 6). About 56 percent of the Philippines’ energy demand is met by indigenous resources, including coal, natural gas, hydropower, and traditional biomass energy.

The Philippines is one of few countries in the world where renewable energy (RE) accounts for the largest share (43 percent) of total primary energy supply (see Figure 4). However, starting in 2002, there has been increasing use of natural gas for power generation with the commercial operation of the Malampaya gas fields. Likewise, the share of coal to total primary energy supply has risen from 5 percent in 1990 to 16 percent in 2007. In overall GHG emissions, the Philippines was ranked 39 in the world in 2005 with about 142 million tons of carbon dioxide equivalent (MtCO₂e), excluding emissions caused by land use change.⁶ The principal sources of GHG emissions are the power and transport sectors (see Figure 5).

Figure 2: Energy Consumption



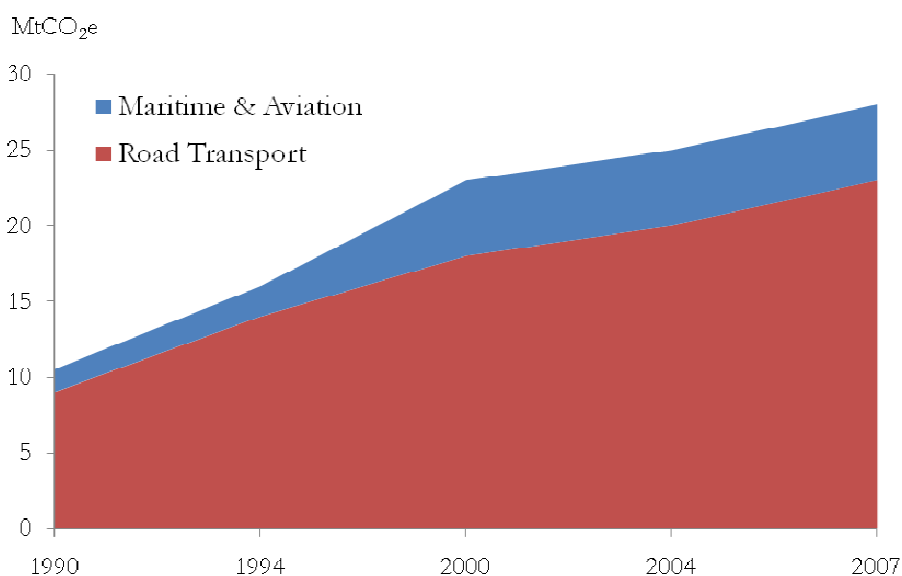
8. The transport sector’s contribution to GHG emissions in the Philippines has increased significantly both in absolute and relative terms since 1990. Carbon dioxide (CO₂) emissions associated with the transport sector have risen from an estimated 6–10 million tons of CO₂ equivalent (MtCO₂e) in 1990 to about 29 MtCO₂e in 2007, an annual increase of about 6–10 percent (see Figure 3).⁷ Of additional concern to the government is the more than doubling of the relative share of transport in CO₂ emissions from about 15 percent of total emissions (excluding those from land use and forestry) in 1990 to about one-third today.

⁶ Climate Analysis Indicators Tool (CAIT), Version 6.0. (Washington, D.C.: World Resources Institute, 2009).

⁷ Six MtCO₂e is based on the World Resources Institute’s estimates, while 10 MtCO₂e is based on the 2006 Intergovernmental Panel on Climate Change (IPCC) guidelines for estimating fuel emissions.

9. Based on the current growth rates in motorization of about 6 percent, and the projected increase in urban population of 35 million by 2030,⁸ emission contributions from road transport, estimated at 24 MtCO₂e in 2007, are projected to increase to 37 MtCO₂e and 87 MtCO₂e by 2015 and 2030, respectively, under a BBAU scenario. This would not only result in a rapid increase in the country’s carbon footprint, but would further exacerbate air quality and increase the already high levels of congestion leading to significant losses in productivity.⁹

Figure 3: Growth in Transport GHG Emissions, 1990–2007



Challenges and Opportunities

10. The Philippines faces substantial challenges in its efforts to maintain economic growth in an environmentally sustainable manner, including the need to hedge against the financial and economic risks associated with increasing fossil fuel imports. The GOP recognizes that a low-carbon growth strategy must also be socially acceptable.

11. Critical reforms have been enacted in the power sector, placing the sector on a full cost recovery basis.¹⁰ By and large, the GOP has implemented substantial power reforms and brought

⁸ Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2007 Revision*, <http://esa.un.org/unup>.

⁹ A study prepared by the National Center for Transportation Studies for NEDA and the Legislative-Executive Development Advisory Council in 2000 indicated that losses because of congestion in Metro Manila alone were around 100 billion pesos per year in 1996 prices, about 4.6 percent of GDP.

¹⁰ The electric power generation subsector has shifted to a purely commercial business with new capacity to be constructed by the private sector. Transmission operations have been converted to a government-owned, concessionaire-operated network, operating on commercial principles with an independent regulator. Distribution systems have been privatized in the major metropolitan areas. Philippine consumers pay some of the highest retail electricity prices in the Southeast Asia region: the average retail tariff is US\$0.22 per kilowatt-hour (kWh).

on stream private investment in new power generation projects in keeping with the Philippine Energy Plan 2008–2030. However, the GOP faces considerable challenges in maintaining competitive electricity prices while balancing environmental concerns because renewable energy options have higher capital costs compared with fossil fuel-based power generation. The government recognizes that some estimates show that under a BAU scenario, 50 percent of installed electricity generation capacity by 2030 will be supplied by coal (APEC 2006). The shift toward using more coal to meet power expansion needs is primarily driven by cost considerations despite the availability of renewable energy resources. The least-cost expansion scenario for power favors coal with a cost of US\$60/MWh over small hydropower (US\$90/MWh), geothermal (US\$100/MWh), biomass (US\$100/MWh), and solar (US\$160/MWh). The Philippine energy road map, endorsed by the President in 2008, recognizes that technology and modal shifts can be implemented to mitigate power and transport sector emissions growth in the near future with a strong effort to address renewable energy development, transmission and distribution system optimization, transport fuels, vehicle technology, infrastructure, and behavioral changes.

Figure 4: Total Primary Energy Supply, 1980–2007

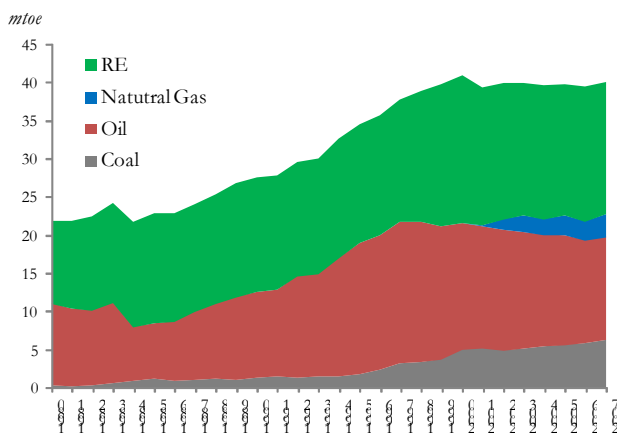
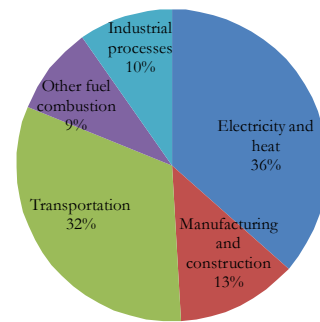
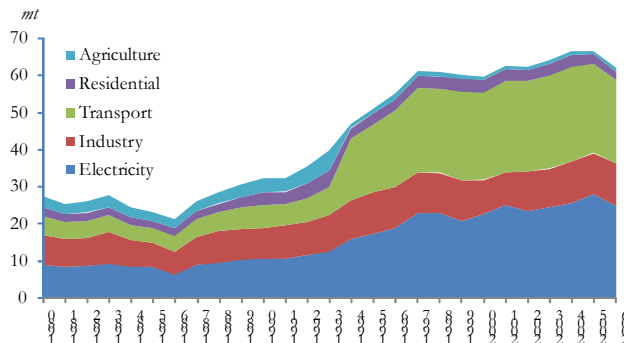


Figure 5: GHG Emissions by Source, 2005*



*Excludes land use change, agriculture, and forestry.

Figure 6: CO₂ Emissions From Fossil Fuels



Source: World Bank, IEA and CAIT/World Resources Institute (2009).

12. As part of its low-carbon strategy, the GOP has opted to phase out petroleum as a primary fuel for power generation, with petroleum fuels used primarily for the transport sector. Biofuels have been given a prominent role in liquid fuel supply since the Biofuels Act of 2006 took effect in early 2007. Substantial private sector investment is being mobilized to develop first-generation biofuels, mainly sugarcane and cassava-based ethanol and coconut methyl ester (CME) for biodiesel. The Biofuels Act mandates that gasoline be blended with 10 percent ethanol (E10) and 5 percent biodiesel blend (B5) by 2011.

13. The GOP also continues to promote power sector reforms and the development of renewable energy through private sector investment. In January 2009, the Renewable Energy Act of 2008 (the RE Act) became effective, which includes the establishment of an RE Trust Fund to be capitalized in part by levies on fossil energy use. The National Renewable Energy Board was established in February 2009 to attain the objectives of the RE Act. In May 2009, the Department of Energy (DOE) released the implementing rules and regulations of the RE Act and in July 2009, created the Renewable Energy Management Bureau. Specific rules for the RE Act relating to the Renewable Portfolio Standard (RPS), feed-in tariffs, and net metering for qualified end users are expected to be released in early 2010.

14. In an effort to further reduce the country's carbon footprint and improve local air quality, President Gloria Macapagal-Arroyo instructed the Department of Transportation and Communications (DOTC) and other transport-related agencies to formulate a NESTS for the country. NESTS will promote the development of Bus Rapid Transit (BRT) systems, expansion of the urban rail network in Metro Manila, deployment of hybrid vehicles in the public transport fleet, and acceleration of fuel-switching in certain public transport modes.

15. Apart from these transport and environmental management strategies, technical assistance (TA) from development partners, such as the ADB, AusAID, IBRD, Japan International Cooperation Agency (JICA), and U.S. Agency for International Development (USAID), have supported the GOP in its pursuit of transport policy and institutional reforms to improve governance and enforcement, and to ensure efficient and effective transport systems, which also contributes to the reduction in GHG emissions. Notable of these are the AusAID Partnership for Economic Governance Reform (PEGR) reform agenda projects, ADB and JICA road sector projects and programs for the country, and the IBRD's road policy programs for improving efficiency in the Department of Public Works and Highways and urban transport programs with DOTC and Metro Manila Development Authority.

16. The GOP's response to the climate change challenge has been active institutionally—note the recent restructuring of the Presidential Task Force on Climate Change. On October 24, 2009, the Climate Change Act of 2009 was signed into law. Under this new law, a national climate change action plan would be prepared that would include roadmaps for mitigation with emphasis on voluntary reduction of local carbon emissions, and adaptation with focus on disaster risk reduction. The law created a Climate Change Commission—an autonomous policy-making body attached to the Office of the President tasked with coordinating, monitoring, and evaluating programs and action plans—that will represent the country in international forums.

17. The international donor community, including such development partners as the ADB, the United Nations International Strategy for Disaster Reduction, the Millennium Challenge

Corporation, and the United Nations Development Programme (UNDP), is actively engaged in addressing climate change in the Philippines. There are several initiatives on capacity building for GHG accounting, monitoring and reporting, for preparation of a second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC),¹¹ governance, renewable energy, urban air quality management, and forest management.

III. PRIORITY SECTORS FOR GHG EMISSIONS REDUCTION

18. The GOP recognizes that the power and transport sectors are the greatest emitters of GHGs, and it is focusing its attention on interventions within the three broad areas listed below to reduce GHG emissions.

- (a) Supply and demand-side energy efficiency (EE), including grid optimization and initial investments in smart grid technology, as well as urban energy efficiency;
- (b) Renewable energy, including biomass and solid wastes, geothermal, hydropower, solar, and wind; and
- (c) Transport systems, including BRT, advanced vehicle technology, urban rail, motor vehicle inspection and emission systems, and wider use of biofuels.

19. The GOP's goals and objectives for RE development are strongly linked to future reductions in GHGs. These objectives are as follows:

- (a) Increase RE-based capacity by 100 percent in 10 years;
- (b) Be the number one geothermal energy producer in the world;
- (c) Be the number one wind energy producer in Southeast Asia;
- (d) Double hydropower capacity with additional 3,000 MW;
- (e) Be the solar cell manufacturing hub in ASEAN; and
- (f) New contribution from biomass, solar, and ocean energy by more than 100 MW.

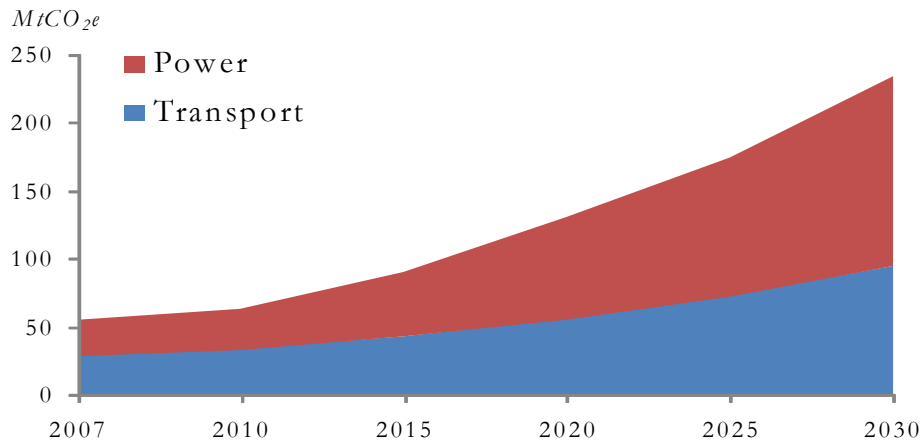
Emission Reduction Scenarios

20. Under a BAU scenario (World Bank 2009), total GHG emissions are projected to increase most rapidly in the power and transport sectors. Table 1 presents the details of the interventions considered for all scenarios. Dependence on imported coal for power generation and petroleum for transport will increase under this BAU scenario considering least-cost options. During the period 2007–30, power emissions will increase from less than 30 to about 140 MtCO₂e per year or more than 400 percent increase, with coal power plants accounting for 96 percent of total CO₂e emissions by 2030, and transport sector emissions will increase from 37 to over 87 MtCO₂e per year (or about 133 percent increase (see Figure 7)).¹²

¹¹ Philippines' initial national communication on climate change prepared in December 1999 with UNDP/GEF support.

¹² Results from APEC (Energy Demand and Supply Outlook of 2006) (Online at: <http://www.ieej.or.jp/aperc>) are also pointing to similar trends in CO₂ emissions.

Figure 7: Baseline GHG Emissions Estimates for the Power and Transport Sectors



Source: World Bank 2009.

21. The World Bank (2009) evaluated two alternative scenarios referred to as the medium and aggressive (low-carbon) scenarios. The power sector study's medium scenario aimed for modest reductions targeting 10 percent energy efficiency across all sectors and doubling RE by 2030. The low-carbon scenario shows an aggressive low-carbon pathway, pushing intensive wind power and solar photovoltaic (PV) RE generation and 15 percent lowering of demand because of EE, resulting in emission levels at just 30 percent of the BAU level in 2030 (see Figure 8). By 2030, installed RE capacity under the aggressive low-carbon scenario will reach 17 GW, a threefold increase from the baseline scenario.

22. For the power sector, energy efficiency programs present a huge potential for mitigation with negative abatement cost (see Figure 10), meaning, the cost of reducing consumption, hence reducing emissions, through energy efficiency is less than the cost of additional coal power plants needed to supply the baseline demand. On the supply side, fuel switching from coal to natural gas, hydro, and wind presents a large mitigation potential at an incremental cost of less than US\$50/tCO_{2e}, with wind power providing the greatest mitigation potential.

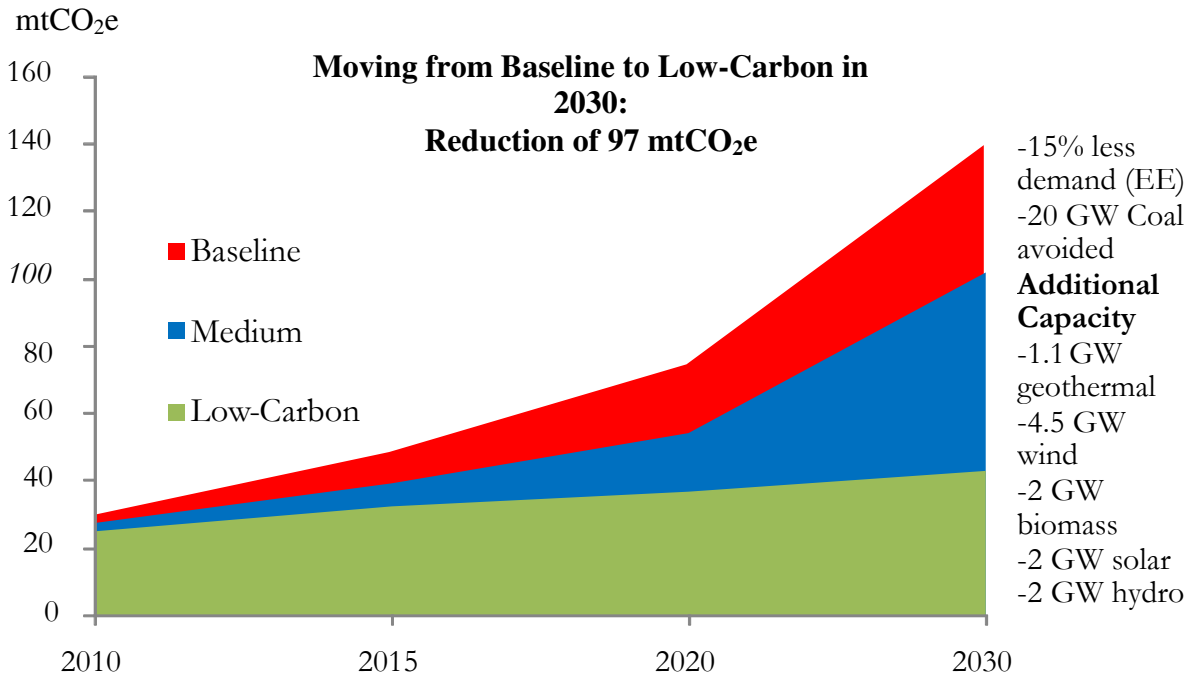
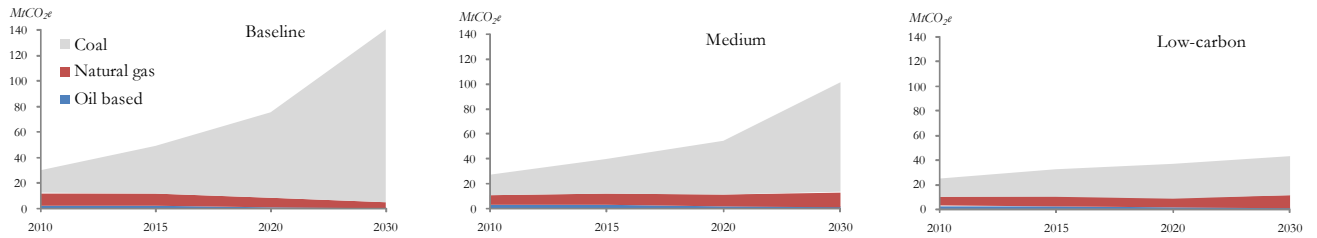
23. The analysis indicates that substantial GHG reductions are possible in the transport sector in the medium- and low-carbon scenarios. Transport sector emissions in the low carbon scenario are 62 percent less compared with the BAU level in 2030, because of the use of mass transit systems, traffic demand management schemes, vehicle efficiency measures and a higher mix of biofuels (see Figure 10). The wider use of biofuels would account for about 70 percent of the reduction, while measures to reduce vehicle usage and increase the modal share of mass transit would account for 15 percent of the reduction in GHG emissions. The balance is attributed to measures to enhance the efficiency of vehicles and reduce their gasoline consumption. Tables 1 and 2 provide the detailed components of the low- and medium-carbon scenarios.

24. The main differences between the two scenarios in transport lies in meeting desired targets earlier, as well as in scaling up faster under the low-carbon scenario. The medium-carbon

scenario targets, among others, 50 km of BRT systems in Metro Manila and Cebu, organized bus route enhancement, north and south extensions of the Light Rail Transit (LRT) 1, 56 percent inspection of the total vehicle population and 5,000 buses to be converted to compressed natural gas (CNG). Targets for the low-carbon scenario include 100 km of BRT systems in Metro Manila, Metro Cebu, and other cities, construction and expansion of more LRT lines, fully financed road maintenance, nationwide coverage of vehicle inspection, and conversion of 50 percent of buses into CNG users.

25. The cost-effective, low-carbon strategy for the transport sector includes a diverse and integrated package of measures that promotes biofuels, low-cost vehicle efficiency improvements, and transport demand management, including BRT development, promoting the shift to lower-emitting transport modes (see Figure 10). Similar to energy efficiency interventions, several of the transport mitigation options have negative abatement costs because of the positive economic benefits of these projects.

Figure 8: Power Sector Emissions Reduction Scenarios, 2010–30

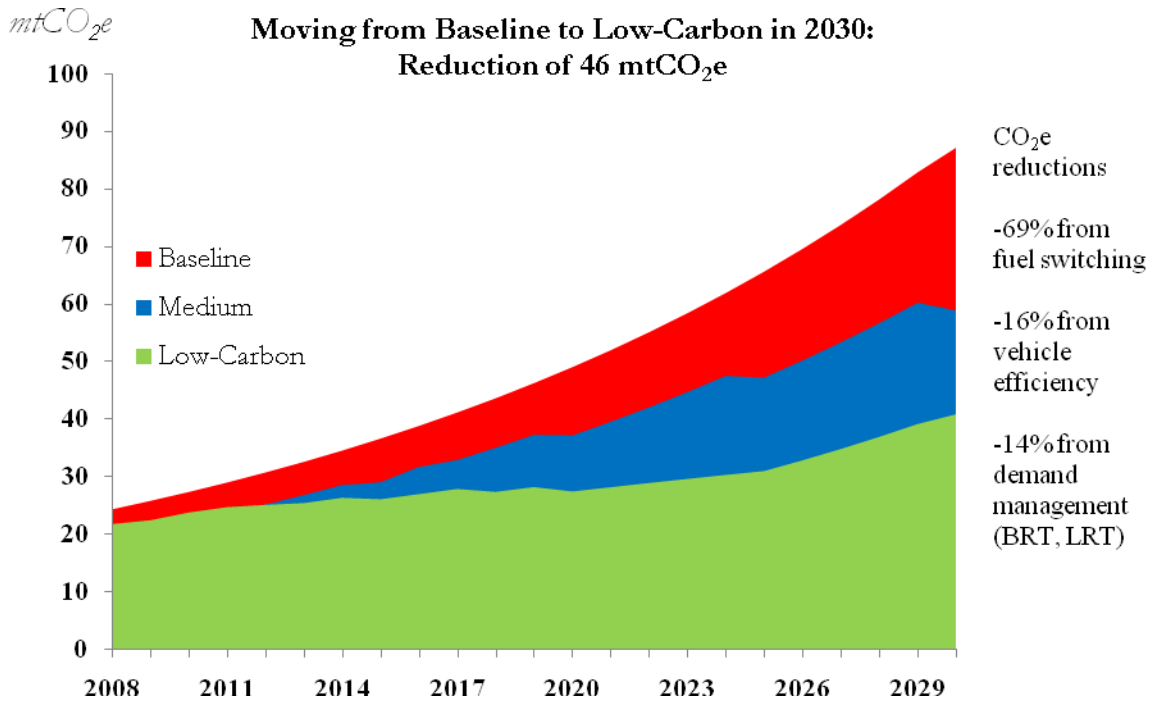
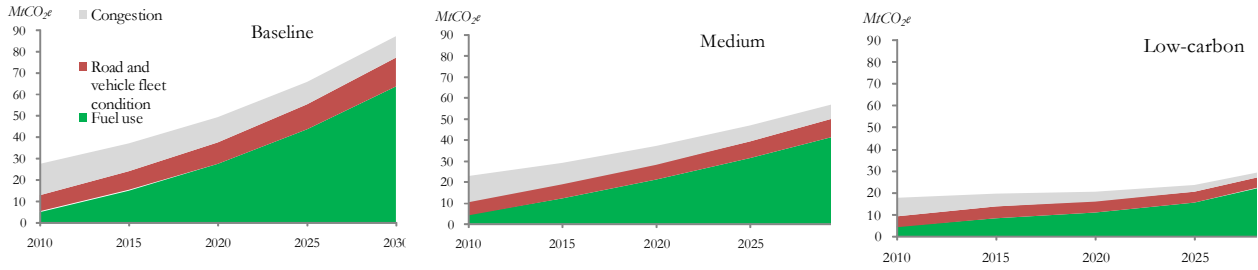


Source: World Bank 2009.

* The medium-carbon scenario targets a 10 percent reduction in power demand because of EE improvements coupled with a shift from coal to lower emission technology like natural gas-based power generation and RE-based power generation that includes hydro, geothermal, wind, and biomass (doubling RE capacity).

** The low-carbon targets assumes a 15 percent reduction in power demand because of EE improvements and an aggressive rollout of wind and biomass (40 times more than the baseline), as well as an ambitious target of 2,000 MW installed solar power from the baseline projection of 1 MW.

Figure 9: Transport Sector Emissions Reduction Scenarios, 2010–30



Source: World Bank 2009.

* The medium-carbon scenario targets, among others, 50 km of BRT systems in Metro Manila and Cebu, organized bus route enhancement and north and south extensions of the Light Rail Transit (LRT) 1. In addition, 56 percent of total vehicle population will be targeted for inspection and 5,000 buses will be converted to CNG.

** The low-carbon scenario targets, among others, 100 km of BRT systems in Metro Manila, Metro Cebu, and other cities. It also includes construction and expansion of more LRT lines, fully financed road maintenance and improvements, nationwide coverage of vehicle inspection and conversion of 50 percent of buses into CNG.

26. Based on the trends in emission growth, policy conditions affecting primary energy supply and demand, and estimated abatement costs, the GHG reduction priorities are in the electric power and transport sectors, which account for about 64 percent of total energy CO₂ emissions (see Figure 5). The NEDA Board's Cabinet-level Infrastructure Committee has identified an ambitious CTF Investment Plan that focuses its interventions on laying out the foundations for a transformation of the energy sector in a way that will achieve the following:

- ***Distributed Generation through Renewable Resources.*** Match the archipelago configuration of the country by facilitating, in the short term, distributed generation projects through scaling up RE resources, which will displace about 300–400 MW of coal generation;
- ***Energy Efficiency through***
 - ***Demand-Side Management.*** Address transmission constraints in the short term, particularly those faced in the Visayas and Mindanao regions by starting the development of a Demand-Side Management Program (smart grid, demand-side management) to improve the creditworthiness of power off-takers in the distribution side of the business, which will displace about 150–200 MW of coal generation.

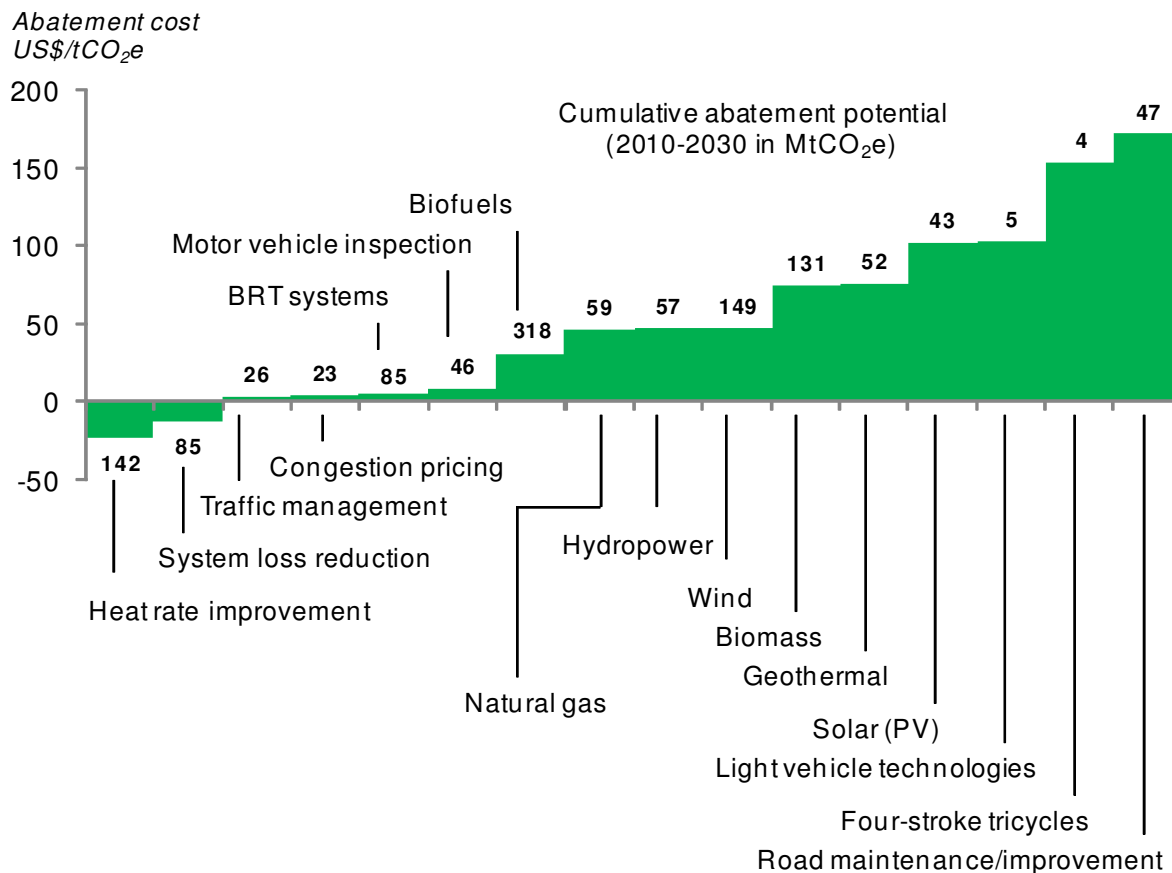
27. The combined impact of the proposed interventions is intended to displace about 450–600 MW of coal generation equivalent to about 3 million tons of CO₂ per year. More important, it will serve as a basis for the government's more ambitious goal of displacing 5,000 MW of coal generation under the low-carbon scenario.

28. In the transport sector, the overall goals of the NESTS are to reduce the annual growth rate of energy consumption and associated GHG emissions from the transport sector in the urban areas of the country and to mainstream environmentally sustainable transport that involves the promotion of low-carbon intensity transport systems.

29. The strategy, which is currently being finalized, sets outcomes and indicators in several areas, including (i) air quality and public health; (ii) vehicle emission control, inspection, and maintenance; (iii) cleaner fuels; (iv) public transport planning and travel demand management; (v) non-motorized transport; (vi) land use planning; (vii) road safety; and (viii) social equity and gender. Although targets and indicators are still being developed, some have already been set, for example, the construction of regional motor vehicle inspection centers in major cities and the conversion of buses, jeepneys, and taxis to be able to use cleaner fuels.

30. The Biofuels Act of 2006 also sets targets for blending fuels. Specifically, the act calls for 10 percent ethanol blending with gasoline (E10) and 5 percent biodiesel blending (B5) by 2011.

Figure 10: Abatement Cost and Cumulative Abatement Potential for the Power and Transport Sectors, 2010–30



Note: When cobenefits of transport sector abatement options are taken into account, most of these costs are negative. Based on investment costs without cobenefits, except heat rate improvements and system loss reduction.

Transport Sector Options	Mitigation Cost With Co-Benefits US\$/tCO₂e
Biofuels	(9.8)
Road maintenance/improvement	(2.1)
Motor vehicle inspection	(5.0)
Congestion pricing	(0.2)
Public transport improvement	(19.8)
BRT systems (100 km)	(29.7)
LRT/MRT lines (46 km)	(33.8)

Source: World Bank 2009.

Table 1: GHG Abatement Options and Cost-Effectiveness at Full Scale-Up

Energy Sector Options	Cost Effectiveness (US\$/tCO₂e)	Potential Annual Mitigation (MT/year)	Potential 2010–30 Mitigation (MT)
System Loss Reduction (by 3%)	-14	4.1	85
Heat Rate Improvement (by 5%)	-24	6.8	142
Hydro	47	2.7	57
Geothermal	76	2.5	52
Wind	47	7.1	149
Biomass	75	6.2	131
Solar (PV)	102	2.1	43
Natural Gas	46	2.8	59
Total		34.3	718

Transport Sector Options	Cost Effectiveness (US\$/tCO₂e)	Potential Annual Mitigation (MT/year)	Potential 2010–30 Mitigation (MT)
Traffic management	3	1.4	26
Congestion pricing	4	1.2	23
BRT systems	5	2.5	53
Motor vehicle inspection	8	2.5	46
Biofuels	31	17.4	318
Light vehicle technologies	104	0.2	5
Four-stroke tricycles	154	0.2	4
Road maintenance/improvement	172	2.3	47
Total		27.7	554

Table 2: Details of the Medium and Low-Carbon Scenarios

Power Sector

Power Sector Scenarios	2030 Installed Capacity in MW (Baseline)	2030 Installed Capacity in MW (Medium)	2030 Installed Capacity in MW (Low-Carbon)	2030 CO₂e Emissions (in million of tons) (Baseline)	2030 CO₂e Emissions (in million of tons) (Medium)	2030 CO₂e Emissions (in million of tons) (Low-Carbon)
Fuel Source						
Coal	26,218	17,291	6,173	135	89	32
Diesel/Oil	756	756	1,256	0.7	0.7	1.0
Natural gas	1734	4,754	4,034	4	12	10
Hydro	3170	4,209	5,589			
Geothermal	2168	3,108	3,304			
Wind	111	252	4,612			
Biomass	50	179	2,127			
Solar	1	1	2,001			
Total	34,208	30,550	29,095	140	102	43

Note: The medium-carbon scenario assumes a 10 percent power demand reduction because of EE improvements, whereas the low-carbon scenario assumes a 15 percent power demand reduction. The low-carbon scenario also assumes a more aggressive rollout of RE-based power generation.

Transport Sector (Impacts in 2020)

Transport Sector Scenarios	Medium Scenario	Low-Carbon Scenario	Energy Use Impact, Fuel Saved/ per year MTOE (Medium)	Emission Impact, GHG Reduced/ per year MtCO₂ (Medium)	Energy Use Impact, Fuel Saved/ per year MTOE (Low carbon)	Emission Impact, GHG Reduced/ per year MtCO₂ (Low-Carbon)
Alternative Fuels						
Biodiesel	PEP 2008 (20% CME by 2030)	20% CME by 2020		3.4	1.8	3.5
Bioethanol	PEP 2008 (E85 by 2030)	Low-carbon: E85 by 2025	1.4	5.2	4.7	11.3
Natural gas	PEP 2008 (5,000 CNG buses by 2026)	10% of all buses and trucks by 2020, 25% by 2025, and 50% by 2030	.02	.06	1.8 (2020–30)	1.6 (2020–30)
Autogas	100% conversion of gasoline-fed taxis by 2015	25% conversion of gasoline-fed private cars by 2020, 50% by 2030	0	.04	0	1.0

Vehicle Efficiency Measures						
National road maintenance and improvements, including traffic management	Current investment level for asset preservation (43% of requirements) ^{1/}	100% of asset preservation needs	0.4	1.0	0.9	2.3
Vehicle inspection and maintenance system, including driver training on eco-driving (5% fuel efficiency improvement)^{2/}	Metro Manila and Regions III & IVA (56% of total vehicle population)	Nationwide coverage	11.6	1.4	20.7	2.5
Energy saving technologies for new gasoline cars and utility vehicles	Direct injection (DI) and variable valve systems (10% fuel efficiency improvement))	Medium and improvements in transmissions, vehicle aerodynamics, tires, and light-weighting (20% fuel efficiency)	1.2	0.1	2.5	0.2
Four-stroke tricycles (20% GHG emission reduction)^{3/}	Metro Manila and Regions III & IVA (53% of total tricycles)	Nationwide coverage	0.4	0.1	0.7	0.2
Vehicle Demand Reduction Measures						
Congestion Pricing for Metro Manila^{4/}	Within C-3 (G. Araneta Avenue)	Within C-4 (EDSA)	0.2	0.6	0.4	1.2
Public Transport Optimization in Metro Manila	EDSA Organized Bus Route Enhancement	Metro Manila-wide public transport route restructuring and service optimization	0.03	0.03	1.4	1.38
Bus Rapid Transit System, including nonmotorized transport	Metro Manila (50 kilometers)	Metro Manila, Metro Cebu, and emerging metropolitan areas	n.a.	0.6–0.8	n.a.	2–3
Metro Manila LRT/MRT Expansion	LRT 1 South and North Extensions	Medium + LRT 7, proposed extensions of LRT 2 and MRT 3	0.3	0.07	0.9	0.19
Total			16	13	36	28

Note: 1/ World Bank (2009), Philippines Transport for Growth: An Institutional Assessment of Transport Infrastructure.

2/ ADB (2004), Feasibility Study for the Privatization of Metro Manila Airshed MVIS Lanes.

3/ PDD: Envirofit Tricycle-Taxi Retrofit Program for Vigan, Tugearao and Puerto Princesa, Version 1-0, October 2008.

4/ Study estimation based on unit costs from London Congestion Pricing.

IV. RATIONALE FOR SELECTED SECTORS

31. This section of the Investment Plan explains the considerations for selecting the emission reduction opportunities presented to the CTF. The measures put forward fall in three subsectors, namely, (i) energy efficiency; (ii) renewable energy; and (iii) urban transport. These are the result of several months of discussions between the GOP and the ADB, IFC, and the World Bank, and they build on years of development experience and policy dialogue between these institutions and the Government of the Philippines. The choice of programs reflects a combination of the government's priorities and sector implementation readiness, the development banks' capacity and focus, and priorities established by the CTF. The paragraphs below present the rationale for the programs put forward.

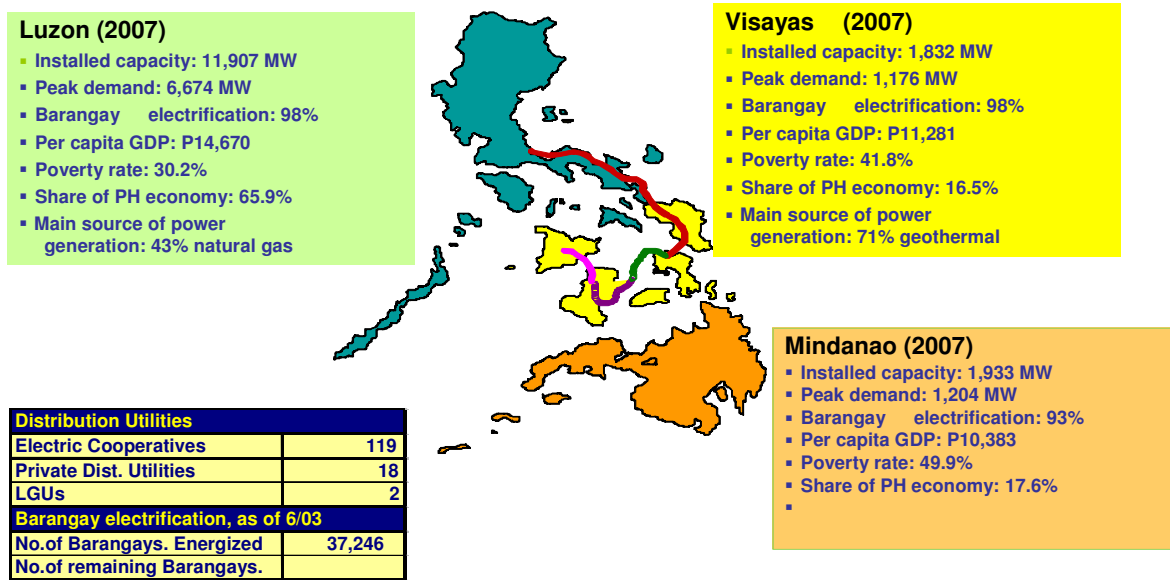
32. The programs proposed for CTF financing do not involve new technology. Rather, they involve technology that is readily available to the Philippines, but that faces institutional, regulatory, or cost barriers (especially upfront investment cost barriers) that must be overcome for replication and scale-up. The GOP envisaged that the support from the CTF would help overcome these barriers and lead to socially responsive and growth-oriented, low-carbon development path.

Energy

A Transformational Strategy in the Energy Sector to Address Growing Demand

33. Unlike any other country that has availed itself of CTF support, the Philippines presents a set of unique spatial and market challenges to achieve its low-carbon scenario: (i) an archipelago country with very distinct power markets and transmission constraints; (ii) a country with one of the lowest per capita electricity consumption in the region; (iii) a country that also exhibits one of the fastest urbanizing trends in East Asia; (iv) a country facing severe power supply constraints, particularly in the Visayas and Mindanao regions, that also happens to be home to some of the poorest regions in the country; and (v) a country where, in a reversal of past trends, new coal power plants are coming, or being planned to come, on stream to address part of the short- and medium-term supply constraints.

Figure 11: Three Regions, Three Different Power Markets



34. Within this context, CTF—with its focus on demonstration, deployment, and transfer of low-carbon technologies—will provide the leverage and initial incentives for the initial stages of sustainable clean technology programs. The Government of the Philippines proposes to assign CTF resources as follows:

- **Renewable Energy:** private sector investment in renewable energy including wind, geothermal, biomass, solar power generation, and small-scale hydropower (up to 10 MW). CTF funds are proposed to be utilized to leverage IBRD funds to reduce the transaction cost and other financial barriers to attract a larger number of financial intermediary institutions to cofinance, in local currency, a larger portfolio of Renewable Energy Projects. The ADB, IFC, and IBRD will leverage CTF support as well, as described in Annexes 1 and 2.
- **Energy Efficiency:** private sector investments in energy efficiency, including demand-side management in the distribution sector, smart grid technology to integrate renewable energy, and energy efficiency in commercial and public sectors. CTF funds are proposed to demonstrate the use of load management and smart grid technology and lower transaction costs in the scaling-up of energy efficiency investments in the public and private sectors. The ADB, IFC, and IBRD will leverage CTF financial support, as described in Annexes 1 and 2.

35. The government is seeking CTF support to start moving from the BAU case to the medium-carbon case first (30 percent below BAU CO₂e emissions) under the current allocation.

36. Overall, it is expected that, as an outcome of CTF leverage, up to 5,000 MW of installed coal-based generation capacity will be displaced by 2030 under the more aggressive low-carbon

scenario from the replication potential of both renewable and energy efficiency based measures at a cost of about US\$60/ton of CO₂e avoided.

Table 3: Results Indicator for RE and EE Interventions

Indicators	Baseline	Investment Program Results
New installed RE-based power generation capacity by 2020	340 MW	100–150 MW of equivalent installed coal capacity displaced by EE interventions by 2020 300–450 MW of installed coal capacity displaced by investments in RE-based generation by 2020
Estimated annual GHG emissions reduction	0 MtCO ₂ e per year	3 MtCO ₂ e per year
Rapid replication potential toward government goal to move from baseline to medium scenario (e.g., from 5,500 MW to 7,750 MW of installed RE-based generation by 2030)	Zero additional RE-based generation capacity from baseline scenario	Investments in RE and EE would result in displacing 450–600 MW equivalent coal installed capacity. It would jumpstart efforts to reach additional 2,250 MW installed RE-based generation capacity under the medium scenario

37. The proposed program meets the criteria set forth by the CTF. That is, (i) the proposed renewable energy interventions would change the structure of electricity generation into one where RE would be an established form of distributed generation; (ii) GHG emissions savings would be expected to reach 3 million tons of CO₂e per year; (iii) the displacement of the equivalent 450–600 MW of installed coal capacity a year would show a high potential for replication to support the government’s target of reducing coal reliance equivalent to 5,000 MW installed capacity; (iv) a strong development impact would result, since most of the geographic areas where investments would be mobilized are also home to poverty stricken communities. The proposed energy program also creates a strong link between encouragement of investments in RE power generation and the development of creditworthy off-takers in the electric cooperatives tasked to distribute electricity to rural communities.

38. CTF financing is necessary to provide appropriate financing and risk mitigations for local financial institutions to support the private sector’s entry into the RE/EE/CP sector. Although there is interest in the market, local financial institutions and private developers are limited to scale-up without enabling concessional and TA support.

39. CTF funds are needed to incentivize financial institutions and local developers to undertake investments in lower-carbon emitting technologies. Many companies involved in the development of RE, EE, and CP have found it difficult to access local funding support in order to invest in such projects. CTF financing could fill the financing gaps on concessionary terms that overcome first-mover costs and provide sufficient returns to pioneer projects. CTF funding, and its flexible application, could provide an incentive to these local financial institutions and developers to implement projects. With effective financial structuring, CTF funds can address the specific barriers and catalyze the sector’s transition to a lower-carbon base. In addition to

transforming the Philippines' energy sector, opportunities exist to share lessons learned and replication in other countries for efficient use of resources regionally.

Transport

40. The transport investments proposed for inclusion in the CTF implementation plan are BRT systems in Metro Manila and Cebu. BRT systems are among the most cost-effective public transport systems in the world. A BRT is a mass transit system that mimics the speed and performance of metros or light rail transit (LRT) but uses buses rather than rail vehicles. As such, BRT combines the reliability of rail and the versatility of conventional bus systems at a fraction of the cost of rail. Although the development of BRT systems will result in significant reductions in GHG emissions, the introduction of biofuels will have a significantly higher impact (as presented in the previous section). Nevertheless, BRT is being targeted for two main reasons: (1) the program of biofuels is ongoing and progressing well; and (2) the economic development impacts of the BRT, particularly for the poor, are substantial.

41. BRT projects have high replication potential in the Philippines, since technology risk is low, and demand and private sector interest are substantial. They are expected to have significant development impacts related to environmental benefits, reduced traffic congestion, improved traffic safety, potential reduction in travel times, and transport cost savings accruing to end users. The magnitude of the benefits and their share to low-income groups will be significantly higher when BRTs are well integrated with public transport systems. Complementary facilities for private vehicle parking and nonmotorized transport enhance the potential to attract private transport users to the BRT lines for daily commuting.

42. Recent USAID-funded studies on Metro Manila noted substantial cost savings and economic benefits in pursuing BRT projects when compared to LRT lines or maintaining the BAU operation of buses and jeepneys on high-traffic transport corridors. Studies are ongoing for a BRT project in Cebu city. The Makati Central Business District currently experiences severe peak hour traffic congestion. This situation is only expected to deteriorate in the future if nothing further is done. The Bonifacio Global City is also growing at a very rapid pace. A high-standard public transport linkage between the Makati Central Business District and Bonifacio Global City will improve the accessibility to and within these two central business districts and introduce public transport services in its potential extension to Circumferential Route 5 (C-5), thus greatly reducing the dependence on private vehicles and associated CO₂ emissions. The proposed system will have several advantages that will facilitate a modal shift from jeepneys, taxis, and potentially private vehicles to public transport. The proposed BRT in Metro Manila is expected to carry up to approximately 5,000 passengers per hour per direction or 75,000 passengers per day by 2030. To give an idea of the impact of not providing the BRT, these 5,000 passengers would require (i) 83 standard buses; (ii) 250 jeepneys; and (iii) 2,500 cars during peak hours. Such a modal shift would realize considerable CO₂ reductions.

43. In addition to the high GHG mitigation potential and the large development impact of BRT projects, the government has a demonstrated strong record in implementing low-carbon transport interventions, particularly in urban rail and bus networks, and the implementation capacity is relatively high because of private sector participation in public transport and vehicle technology development. Nevertheless, the lack of knowledge in the Philippines of BRT

systems, coupled with the familiarity with the more expensive LRT, has impeded the development of BRTs. In addition, while the economics of BRT projects are generally robust, with large benefits accruing to the lower-income groups, a certain level of financial support is often necessary for reasons of affordability to launch BRTs. Unfortunately, carbon finance has not played much of a role in the transport sector.¹³

44. The BRT systems envisioned for the Philippines have the cumulative GHG emissions abatement potential of about 2–3 Mt CO₂e per year. However, the proposed investments could lead to more BRTs than is currently envisioned as other cities start to recognize their benefits. Emerging metropolitan areas, such as Metro Davao, Naga, Bacolod, Iloilo, and Cagayan de Oro, have been identified as potential sites for BRT project implementation. (The proposed BRT interventions are estimated to reduce GHG emissions by about 0.6–0.8 Mt CO₂e per year.)

45. CTF support to the proposed BRT projects is critical, since these projects demonstrate well the sound principles for design and integration of BRTs into the public transport system. Several BRT initiatives worldwide have failed because they were neither designed nor implemented adequately, and merely treated as regular buses operating on separate lanes. These failures make it much harder to reconsider BRT initiatives in the future. This is all the more important in the case of the Philippines where the GOP has been considering BRT projects for the past 10 years, but is yet to implement one. CTF financing is also expected to result in an enhanced design and accelerated implementation of several BRT systems. Implementation in Cebu also supports NESTS policy to increase local government investment in environmentally sustainable transport.

V. ENABLING POLICY AND REGULATORY ENVIRONMENT

46. The GOP energy policy emphasizes private sector development and investment, with independent regulation. Fuel subsidies have been largely phased out, although diesel fuel is cross-subsidized, and some controls are exercised to prevent rapid price spikes. The overarching paradigm for energy and transport is to (i) use less energy; (ii) use energy in all forms more efficiently; (iii) improve energy independence and security by developing indigenous energy resources; and (iv) maximize private sector investment. Relevant energy and transport policies are summarized in Table 4 and discussed below.

¹³ The “mobile” nature of transport vehicles makes it difficult to isolate reductions in carbon emissions in a corridor that could have resulted from a transport improvement.

Table 4: GOP Power and Transport Policy Framework

Sector/ Sub-Sector	Key Policies, Programs, and Objectives	Expected Outcomes	Issues/Comments
Energy Efficiency	<p><i>Energy Efficiency and Conservation Plan of Action:</i></p> <p>Objectives: Establish legal framework for EE. Reinstate demand-side management (DSM) practice across all sectors. Establish baseline data and benchmarks. Scale-up information and education campaign on EE.</p> <p>Strategy:</p> <p>Higher taxes for inefficient technologies and support implementation of AO183. Develop and implement lamp waste management policy. And conduct policy study on Calibrated Phase-out of inefficient technologies. Develop curriculum and instructional materials. Initiate social mobilization program for market monitoring. Push for retrofit program across all sectors.</p> <p>National Energy Efficiency and Conservation Program (NEECP):</p> <p>Promote efficient utilization of all forms of energy. Public Awareness and Information Dissemination. Voluntary Agreement Program. Energy Labeling and Efficiency Standards. Government Energy Management Program (GEMP). Energy Management Advisory.</p> <p>Philippine Efficient Lighting Market Transformation Project (PELMATP) supported by Global Environment Facility. Philippines Energy Efficiency Project partly funded by the ADB.</p>	<p><i>Energy Efficiency and Conservation Plan of Action:</i></p> <p>Use less energy. Use energy more efficiently. Implement Heat Rate Improvement Program (HRIP) for power plants. Restart Distribution Utility Demand Side Management programs and Expand System Loss Reduction Program for all utilities.</p> <p>NEECP:</p> <p>Achieve a total energy savings of 234 MMBFOE in the 10 years from 2005 through 2014.</p> <p>Reduce oil imports by 16%.</p> <p>PELMATP: Accelerate the integration of energy efficient lighting programs with other planned DOE activities, and enhance the private sector participation in EE through lighting technologies.</p> <p>Net metering to be implemented under the RE Act of 2008.</p> <p>Time of use tariffs to be expanded.</p>	<p>Lack of an Energy Conservation Law restricts DOE authority to impose mandatory conservation measures, EE standards, and other conservation and/or utilization targets. EE still faces financing barriers partly because of the invisibility of EE measures and difficulty in demonstrating and quantifying results.</p> <p>NEECP has had mixed success in implementation: in 2006, the NEECP realized savings of 0.51 MMBFOE and reduced emissions by approximately 188,000 tons of CO₂.</p> <p>System Loss Reduction Program under NEECP was reasonably successful and could be expanded Limited private sector participation to date. Expansion of ESCO market being promoted by the ADB.</p>

Sector/ Sub-Sector	Key Policies, Programs, and Objectives	Expected Outcomes	Issues/Comments
Renewable Energy	<p><i>Renewable Energy Act of 2008:</i></p> <p>Income tax holiday, duty-free importation of technology, tax credit on domestic capital equipment, and services.</p> <p>Ensure open access to connect new RE projects to the grid,</p> <p>Implementation of an Renewable Portfolio Standard and creation of a Renewable Energy Market</p> <p>Feed-in tariffs.</p> <p>Green Energy option for end- users.</p> <p>Net metering for qualified end- users with RE systems.</p> <p>Preferential “must run” dispatch for intermittent RE sources, such as wind, solar, and run-of-river hydropower.</p>	<p>Ensure sufficient, stable, secure, accessible, and reasonably priced energy supply.</p> <p>Pursue cleaner and efficient energy utilization and clean technologies adoption.</p> <p>Diversify energy mix in favor of indigenous RE resources, and promote broad use of RE as alternative fuels and technologies.</p> <p>Make the Philippines a manufacturing hub for PV cells to facilitate development of local manufacturing industry for RE equipment and components.</p>	<p>RE potential remains underdeveloped and is projected to lose share relative to coal-fired power over the next two decades. Development barriers include higher capital cost for most RE technologies, cost of transmission access, and off-take risk, which constrains commercial bank financing.</p>
Transport	<p>AO254: National Environmentally Sustainable Transport Strategy (NESTS).</p> <p>Draft National Transport Policy Framework (NTPF) and National Transport Plan (NTP), 2011–2016.</p> <p>Biofuels Act of 2006.</p>	<p>Reduced consumption of fossil fuels.</p> <p>Reduced local air pollutants and GHG emissions.</p> <p>10% ethanol blend with gasoline (E10) and 5% biodiesel blends (B5) by 2011.</p>	<p>Government at all levels are fully supportive of the administrative order and set to adopt the NTPF and have developed plans to implement sustainable transport projects in several cities across the country. Development of new biofuel production plants is being hampered by lack of early project development funding to cover feasibility studies and front-end engineering design.</p>

Source: DOE website; consultants report under ADB TA 6346-REG, March 2008, and AusAID/PEGR RA008-02.

Policy Context and the Philippine Energy Plan

47. The 2001 passage of the Electric Power Industry Reform Act (EPIRA) marked the beginning of a transformation of the power sector in the Philippines. This process of sector reform is still ongoing. A general principle of EPIRA is to establish an environment and structure where market forces, freedom to choose how and from whom to buy and sell, and effective competition set generation prices prevail. Among electricity buyers, EPIRA also calls for improvements in Electric Cooperatives’ (EC) performance, including rehabilitation and restructuring.

48. The power and transport fuel policies are effectively subsets of the overall Philippine Energy Plan (PEP), which was updated in 2008. The PEP update reaffirms the commitment to pursue the energy independence agenda under the Government's Five-Point Reform Package. The energy sector's agenda focuses on attaining a sustainable 60 percent energy self-sufficiency beyond 2010 and promoting a globally competitive energy sector. The first objective is anchored on the effective implementation of the following goals:

- (a) Enhancing energy efficiency and conservation;
- (b) Intensifying renewable energy resource development;
- (c) Increasing the use of alternative fuels; and,
- (d) Accelerating the exploration, development, and utilization of indigenous energy resources.

49. The energy sector goals and corresponding strategies both support the Medium-Term Philippine Development Plan (2005–2010) and the Medium-Term Public Investment Program. The PEP is also consistent with international agreements, such as the 2002 Johannesburg Summit and the 2000 U.N. Millennium Development Goals, specifically in addressing poverty and ensuring environmental sustainability.

50. Recent energy developments include: (i) the landmark passage in January 2007 of Republic Act (RA) 9367 or the "*Biofuels Act of 2006*," (ii) renewed interest in the upstream development sector through the Philippine Energy Contracting Round (PECR); (iii) commitments to regional frameworks such as the ASEAN Plan of Action for Energy Cooperation (2004-2009); and (iv) the ASEAN initiative to move the harmonization of biofuel standards forward. The Renewable Energy Act of 2008 (the RE Act) was approved and became effective in January 2009. The implementing rules and regulations were approved in July 2009. The RE Act provides for a variety of fiscal incentives and regulatory measures, including the following:

- A Renewable Portfolio Standard (RPS) mandating a certain share of power to be provided by renewable energy;
- Feed-in tariffs;
- Net metering for qualified end-users;
- Establishment of a RE Trust Fund; and
- Tax holidays and exemptions.

51. The details of the RPS, feed-in tariffs, net metering, and RE Trust Fund will be developed by the National RE Board.

National Environmentally Sustainable Transport Strategy

52. On January 2009, Administrative Order (AO) 254 was issued by President Gloria Macapagal-Arroyo instructing transport authorities to develop a NESTS for the country. The administrative order requires DOTC to reform the transportation sector, by defining and implementing policies favoring non-motorized transport and mass transport systems, and leading

to lower consumption of fossil fuels. The government at all levels is fully supportive of the administrative order, is set to adopt the National Transport Policy Framework (NTPF), and has developed plans to implement sustainable transport projects in several cities across the country. The Draft National Transport Policy Framework (NTPF) and National Transport Plan (NTP), 2011–2016 are expected contribute to reducing local air pollutants and GHG emissions. In 2006, the Biofuels Act was signed into law calling for 10 percent ethanol blend with gasoline (E10) and 5 percent biodiesel blends (B5) by 2011.

VI. IMPLEMENTATION POTENTIAL AND RISK ASSESSMENTS

53. Implementation potential and risk are centered around a few key issues: (i) readiness of proposed CTF supported projects in an election year; (ii) the somewhat immature policy framework for EE, and new legislation that is not expected until after mid-2010; (iii) key provisions of the RE Act of 2008 not being in place until 2010 (e.g., the RPS and feed-in tariffs); (iv) RE projects that must deliver electricity below current retail tariffs; and (v) the institutional arrangements for BRT projects and the roles of national and local governments as far as project ownership, implementation responsibilities and assumption of debt. The government is working on resolving these issues to tap the large potential of BRT projects in the Philippines by formulating the regulatory and institutional framework under the DOTC study on public transport strategic development.

54. The overall implementation risk is considered to be medium. New business models are being utilized, and prevailing energy prices, especially electricity tariffs, clearly favor scale-up and replication of RE and EE activities. The Philippines is an early adopter of RE technologies, and such systems as geothermal power; biomass, small hydropower, and wind power technologies are now being deployed. Sufficient private sector expertise exists to implement new RE projects and programs, and there is substantial private investment in transport systems (buses, jeepneys, and tricycles). Crude oil and petroleum product prices have increased by more than 50 percent from late 2008 lows, and are expected to remain stable for the next two to three years. Implementation potential and risks are summarized in Table 5.

Table 5: Implementation Potential and Risk Summary

Risk	Mitigation	Residual Risk
<p>Project Readiness</p>	<p>Selecting proposed CTF supported projects with high GHG mitigation potential that had been under preparation and that enjoy GOP support.</p> <p>Portfolio of alternative projects for CTF support are ready to take the place of existing proposals that might encounter project readiness issues.</p>	<p>Medium</p>
<p>Government engagement</p>	<p>Mitigation of this risk is done by careful selection of projects that have a high level of implementation readiness.</p>	<p>Medium</p>
<p>Policy and Regulatory Framework:</p> <p>Clarity of policies related to RE, EE, and BRT.</p>	<p>The GOP, with the help of international consultants funded by the World Bank, is undertaking work that will lead to clarity in policies related to RPS and feed-in tariffs.</p> <p>MDBs will bring global best practice in EE.</p> <p>With support from a DOTC-financed study, the GOP will clarify the regulatory and institutional frameworks for BRTs.</p>	<p>Medium</p>
<p>Implementation Capacity:</p>	<p>LGUs involved in the implementation of BRT projects will receive the necessary support through the project to further build their implementation capacity. Initial capacity development is focus on DOTC and Metro Cebu technical staff.</p>	<p>Medium</p>
<p>Finance:</p> <p>Commercial banks are reluctant to lend for EE and some RE projects.</p>	<p>Innovative financial products will be offered to address the financial sector’s reluctance to lend to EE and RE proponents. TA will be provided, as necessary, to upgrade commercial bank capacity to assess and mitigate project risk.</p>	<p>Medium</p>
<p>Scale-up and Replication:</p>	<p>Perceived financial risk will be reduced as successful project implementation will demonstrate that financing of EE, RE, and low-carbon transport projects are good business opportunities for the domestic financing sector.</p>	<p>Medium</p>
<p>Safeguards</p>	<p>Project design will follow the GOP and multilateral bank safeguards. Appropriate environmental management measures will be incorporated into project design.</p>	<p>Low</p>

VII. FINANCING PLAN AND INSTRUMENTS

55. Financial instruments anticipated for the Philippines CIP include grants, loans, and guarantees. Other innovative financing mechanisms may be developed for private sector projects. Grants will be utilized for project preparation covering feasibility studies, due diligence, and structuring of private sector projects, e.g., power off-take guarantees. Project preparation is expected to require a total of US\$3.5 million: US\$2.5 million for RE and US\$1 million each for transport sector projects. These preparation funds will be complemented by other donor funds from the ADB, JICA, PPIAF, and others.

56. Loans will comprise the bulk of project and program financing, and could include project loans and sector loans. Program loans may be employed in parallel to support policy development and implementation costs. Cofinancing will be mobilized to the maximum extent possible from other funds from the IBRD, IFC, JICA/JBIC, private sector investors, and other donors. The draft investment plan envisions US\$250 million in CTF funding, as shown in Table 6 below.

57. Guarantees will be used for private sector projects to mobilize commercial bank lending and project developers' equity. Guarantees may include partial credit guarantees, risk sharing, and other innovative forms, depending on project structuring.

Table 6: Program Financing
(US\$ million)

Financing Source	Renewable Energy (WBG)	Urban Transport (WBG)	RE and EE (ADB)	Total
CTF	75	50	125	250
GOP/DBP	180	50	50	280
IBRD	250	250		500
IFC	250			250
ADB			400	400
Others	750		350	1,100
TOTAL	1,505	350	925	2,780

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Annex 1: Energy Efficiency and Renewable Energy Program (IBRD; IFC)

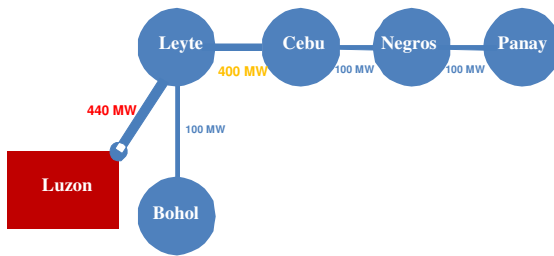
Problem Statement

1. **Removing Supply Shortages.** The tightening electricity supply/demand situation, particularly in the Mindanao and Visayas regions call for a rapid mobilization of resources to facilitate new supply investments. As a short-term response, private sector–led new investments in coal power generation are being developed in both Cebu (MW 200) and Mindanao, even though the latter is endowed with ample renewable energy resources, such as hydropower, biomass, and geothermal. The shift toward using more coal to meet power expansion needs is driven primarily by cost considerations despite the availability of renewable energy resources. Least-cost expansion scenario for power favors coal with a cost of US\$60/MWh over small hydropower (US\$90/MWh), geothermal (US\$100/MWh), biomass (US\$100/MWh), and solar (US\$160/MWh).

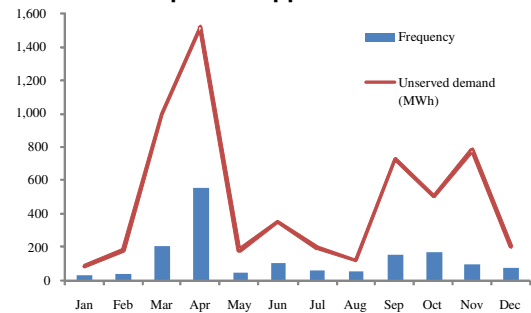
Figure A1-1: Unmet Demand

**The problem of unmet demand:
Visayas**

Inadequate transmission infrastructure

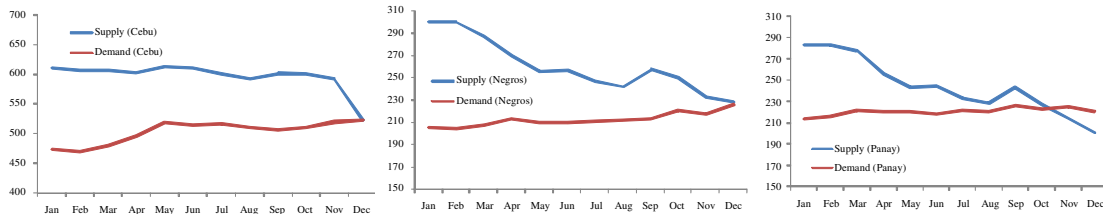


...leads to frequent dropped load and unmet demand



It does not appear to be getting better...

Demand and Supply Balance for 2009 (Transco projections)



2. **Ensuring efficient and viable off-takers.** The Renewable Energy Act of 2008 has set forth a supportive policy environment to allow RE based power generation to develop and grow. However, for this to be fully sustained, creditworthy off-takers from the distribution side of the electricity business must be cultivated. No significant new RE generation investments will take place if investors are not assured that financially viable counterparts exist.

3. Currently, there are 119 electric cooperatives responsible for distributing electricity to 80 percent of the *barangays* in the Philippines. Based on National Electrification Administration data in 2007, the financial and operational position of the electric cooperatives vary widely. About 63 electric cooperatives had insufficient revenues to cover their operating and debt service costs, while 32 electric cooperatives were unable to cover even their operating costs. The collection efficiencies of electric cooperatives are lower compared to private investor-owned utilities. In addition, 61 electric cooperatives reported power losses greater than the 14 percent regulatory cap, with 11 electric cooperatives reporting system losses higher than 20 percent. Under these conditions, investors face significant risk and have refrained from entering the market, even if supported by concessional funds and regulations. Therefore, the viability of electric cooperatives is a critical factor in scaling up renewable energy in the Philippines.

Proposed Transformation

4. It is proposed that CTF cofinancing support a two-pronged approach:

- (a) Accelerate deployment of renewable energy as an established form of distributed generation at sufficient scale in the country to encourage new investments. **If scaled up to its full potential, the generation of power based on renewable energy resources, including biomass, geothermal, hydro, solar, and wind, can add up to mitigating 20 MtCO₂e of emissions per year.**
- (b) Institutionally transform electric cooperatives and improvements in their operations, including demand-side management, smart metering technology, and the managerial capacity necessary to compete after full realization of EPIRA, so that the off-taker risk is mitigated for potential RE investors. **The World Bank (2009) estimates that, as a result of project support, a 3 percent improvement in load management and system loss reduction practices can potentially lead to 1 million MtCO₂e in emission reductions per year.**

5. IBRD/CTF funds will be directed toward addressing long-term credit access and credit enhancement facilities in small and medium-size projects, focusing on private developers and on electric cooperatives that have limited access to commercial financing. IFC/CTF funds will be directed toward the provision of risk sharing capital in partnership with local commercial banks for medium-size to large projects in the renewable and energy efficiency arena.

6. The IFC has identified various areas where the use of CTF funded interventions in the private sector can have a transformational impact on the carbon footprint of the country. Different sectors will require different interventions to address their specific needs. The proposals of private sector products in the Philippines will retain the flexibility to respond to dynamic market conditions and unidentified market opportunities. The proposed interventions will therefore be illustrative only, with more implementation details to be developed as each of the investments and advisory service projects is processed.

7. Scaling- up the renewable energy market requires a solid EC market as off-taker. The ECs cover close to 75 percent of Philippines consumers, mostly outside Manila, yet only close to 20–30 percent of the 119 ECs are financially viable, such that they have access to commercial

borrowing. Concessional financing in large scale is a building block required to bring about a transformation of the distribution sector in Philippines, and consequently securing a growing renewable energy market.

8. The ongoing Rural Power Project through Development Bank of the Philippines (DBP), and the guarantee program through Local Government Unit Guarantee Cooperation (LGUGC), have demonstrated that CO₂ emissions reductions can be delivered—and sustained—by ECs investing in improvements in rationalization of the sub-transmission assets, introducing smart metering technology, bringing in the discipline of commercial financing and in particular improving corporate governance practices. *This proposed energy program envisages a large-scale flagship program to buy down the cost and provide credit enhancement facilities to scale-up an aggregation of sub-transmission assets, installation of smart meters, mobilization of domestic commercial financing, and continued improvement of technical and management capabilities of ECs through different business models.*

Implementation Readiness

9. The DBP has a track record in efficient implementation of renewable and energy efficiency projects. The successful implementation of the first phase of the Philippine Rural Power Project, collaboration among the DBP, IBRD, and the Global Environment Facility (GEF) showed that commercial financing of renewable energy can be a viable business line for financial intermediaries. The initial amount of US\$10 million was subscribed to by sub-borrowers a year ahead of schedule, and additional financing of US\$40 million was approved by the World Bank in 2009, suggesting that the business model now needs support to go to scale.

10. A number of private sector RE/EE/CP projects could be implemented during 2009/2010 with the appropriate financial and risk incentives. Many of these companies have already approached the IFC for assistance in obtaining financing on terms that would make the project feasible. The IFC believes it could support three to five RE/EE/CP projects in the short term if the requested CTF resources were available.

Rationale for CTF Financing

11. The proposed program meets the criteria set forth by the CTF. That is (i) the proposed renewable energy interventions would change the structure of electricity generation into one where RE will be an established form of distributed generation; (ii) GHG emissions savings are expected to reach 3 million tons of CO₂e per year; (iii) the displacement of the equivalent 450–600 MW of installed coal capacity a year show a high potential for replication to support the government’s target of reducing coal reliance equivalent to 5,000 MW installed capacity; and (iv) there is a strong development impact because most of the geographic areas where investments will be mobilized are also home to poverty-stricken communities. The proposed energy program also creates a strong link between encouragement of investments in RE power generation and the development of creditworthy off-takers in the electric cooperatives tasked to distribute electricity to rural communities.

12. CTF financing is necessary to provide appropriate financing and risk mitigations for local financial institutions to support the private sector’s entry into RE/EE/CP sector. Many companies involved in the development of RE, EE, and CP have found it difficult to access local funding

support in order to make investments in such projects. CTF financing could fill the financing gaps on concessionary terms that overcome first-movers and provide sufficient returns to pioneer projects. CTF funding and its flexible application could provide an incentive to these local financial institutions and developers to implement projects. With effective financial structuring, CTF funds can address the specific barriers and catalyze the sector’s transition to a lower carbon base. CTF concessional finance also helps to expand the number of ECs whose operations can be strengthened as renewable energy off-takers, thereby reducing investor risk and enlarging the market for power producers.

13. In addition to transforming the Philippines’ energy sector, opportunities exist to share the lessons learned and facilitate replication in other countries for efficient use of resources regionally.

14. *Technical Assistance*: About 5 percent of the proposed CTF funding will be used for

- Development of a Project Preparation Facility with DBP and other financial institutions; and
- On-the-ground advisory services.

Table A1-1: Program Financing
(US\$ million)

Source	RE
CTF	45–55 (IBRD) 20–30 (IFC)
IBRD	250
IFC	250
GOP/DBP	180
Others	750
Total	1,505

Table A1-2: Program Preparation Timetable

Milestones	Dates
Government concept approval/Bank concept review	October 2009
Project preparation	November 2009–July 2010
Appraisal/Negotiations	October–November 2010
Approval	December 2010
Project Implementation Start	March 2011

Annex 2: Mainstreaming Solar Power to Mitigate Climate Change (ADB)

Problem Statement

1. The Philippines is leading in energy efficiency and the use of indigenous renewable energy in the ASEAN region. It was the first country to declare plans to phase out incandescent bulbs and was the first country to establish energy labeling for air conditioners (1992). The country has firmed up its lead by enacting the new Renewable Energy Law (December 2008) and the necessary implementing rules and regulations (July 2009). Although the legal framework and political willingness are in place, the country needs large investments to put its policy intentions into practice, and to mainstream the use of renewable energy in all segments of the sector. Under the business-as-usual scenario (2010–30), energy-related emissions from the commercial, industry, power, and residential sectors will increase by 123 percent from 77.4 MtCO₂e per year to 172.5 MtCO₂e per year.¹⁴
2. The Philippines is the second largest geothermal power producer in the world, has the highest wind power potential in the region, has large potential for solar power, and has abundant hydropower and biomass resources. Despite these resources, the Philippines was only 45 percent self-sufficient in energy in 2001, which rose to 57 percent in 2007. The government is aiming to reach 60 percent self-sufficiency by 2010. In 2008, about 26 percent of power generation was from imported coal and about 23 percent from oil. In 2008, the country imported about 101.4 million barrels of oil, costing US\$7.5 billion.
3. According to the Philippines Department of Energy (DOE) and the U.S. National Renewable Energy Laboratory (NREL), the potential for renewable energy is significant: about 4,500 MW from geothermal; 13,000 MW from hydropower; 5.0–5.1 kWh/m²/day from solar; about 75,000 MW from wind; and 170,000 MW from oceanic currents.
4. The Philippines Renewable Energy Act of 2008 is considered to be the first and most comprehensive renewable energy law in Southeast Asia. It has already helped mobilize new investments. As of October 2009, the Philippines Department of Energy (DOE) has signed US\$2.2 billion worth of new renewable energy contracts with 18 power companies.
5. The new law provides a seven-year income tax holiday and tax exemptions for the carbon credits generated from renewable energy sources. A 10 percent corporate income tax (compared against 30 percent regular tax) is also provided once the income tax holiday expires. In addition, the law (i) provides a 1.5 percent realty tax cap on the original cost of equipment and facilities to produce renewable energy; (ii) prioritizes the purchase, grid connection, and transmission of electricity generated by companies from renewable energy sources; and (iii) exempts power generation from value added tax.
6. The most interesting provision is a net metering scheme that will allow consumers the option to generate their own power and transfer excess power to the grid. A customer, as an independent power producer, will be able to earn from the power they contribute to the grid at an approved feed-in tariff. The feed-in tariff will provide a guaranteed fixed price for at least

¹⁴ Emissions data are from APEC Energy Demand and Supply Outlook of 2006.

12 years for electricity produced from emerging renewable resources (wind, solar, ocean, run-of-river hydro, and biomass).

7. Electricity retailers will also be required to maintain a minimum amount of generation from renewable energy sources, commonly known as the Renewable Portfolio Standard (RPS) ensuring that the retailers have an incentive to use renewable energy at approved feed-in tariff rates in its generation portfolio. Under the same law, a submarket of the Wholesale Electricity Spot Market will be created for trading Renewable Energy Certificates (RECs).

8. A study done by the WWF and the University of the Philippines National Engineering Center showed that the country can save as much as US\$2.9 billion annually from the avoided importation of fossil fuel if the country's renewable energy share if its power generation mix is increased from less than 1 percent to about 40 percent.

9. In March 2009, the ADB approved a loan project and a grant (Philippine Energy Efficiency Project, PEEP),¹⁵ to start up a comprehensive energy efficiency program to identify a range of pilot that could be scaled up later. The project will (i) retrofit about 40 government-owned office buildings with efficient lighting; (ii) procure 13 million compact fluorescent lamps (CFLs) for distribution to residential and other customers to reduce peak power demand; (iii) introduce energy-efficient lamps for public lighting; (iv) set up a laboratory for testing energy-efficient appliances and a lamp waste management facility; (v) establish a super energy service company (ESCO) to support ESCO development; (vi) promote an efficient-building initiative; and (vii) develop and implement a communication and social mobilization program. This project will result in savings of about US\$100 million per year from avoided fuel cost and deferral of an investment of US\$450 million in power generation and associated network capacity of 450 MW, which is about 3 percent of the Philippines' total generation capacity. Poor customers would particularly benefit, since lighting is a significant component of their electricity consumption. The distribution of the CFLs was formally launched on September 26, 2009, after a year-long preparation and procurement of the CFLs.¹⁶ The project has transformed the market for efficient lighting in the Philippines and expects similar result from the proposed large-scale implementation of solar power with the support of the Philippines Renewable Energy Law.

Proposed Transformation

10. The legal framework and the economic incentives provided by high energy costs have not been sufficient for the adoption of clean energy and energy efficiency by ordinary citizens and businesses. The recent development in energy efficiency and renewable energy is increasing the technology divide, most evident by average citizens' ignorance not just of how to utilize energy efficiency and renewable energy in everyday life, but more importantly in even knowing what technology choices they have. The proposed project will bridge the growing technology divide between the informed (often the public sector and the rich among the population) and the ill-

¹⁵ ADB 2009. Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Republic of the Philippines for the Philippine Energy Efficiency Project.

¹⁶ Details available at [http://rtvm.gov.ph/index.php?option=com_content&view=article&id=1763 percent3Apublic-launch-of-the-switch-to-compact-fluorescent-lamps-cfls-program&Itemid=61](http://rtvm.gov.ph/index.php?option=com_content&view=article&id=1763%20percent3Apublic-launch-of-the-switch-to-compact-fluorescent-lamps-cfls-program&Itemid=61).

informed (nonurban and poor) by attacking it from two different angles: usability (through implementation) and education (through awareness). In addition, it will incorporate the three proven elements from the CFL distribution component of the PEEP, which set it apart from similar initiatives: (i) *economy of scale*—bulk procurement of 13 million units at a reduced unit cost of more than 60 percent of the retail price; (ii) *improved technology credibility*—the consumer markets were made aware of the benefits of the technology and pushed “10,000 hour” bulbs when the local market carried only CFLs with a life of between 1,000 and 6,000 hours; and (iii) *CDM ready*—being a large project, it qualified and was able to finance the initial costs for CDM under the “Program of Activities” approach. The “CFL experience” has taught all a lesson: compelling economics, short payback periods, and friendly regulation are not sufficient for “big-bang,” large-impact changes, which is only possible with large investments that can “shake up” the existing paradigm and mindsets that are often the main barrier to new technology investments.

11. With that spirit, the Philippines Department of Energy (DOE) and the ADB have decided to focus on a single well-proven technology solution that is well established, but still remains outside the reach of ordinary citizens. As part of the government’s scale-up plan for PEEP, the government is preparing a new multitranche financing facility (MFF) to support the long-term EE and RE investment program that is scheduled for ADB Board approval in 2010. The MFF will provide up to US\$200 million in loan funding that will leverage a US\$1 billion investment program over a seven-year period. The first tranche of the MFF will provide TA and financing to scale up some of the existing programs and other programs under the title of “New Energy Technology to Mitigate Climate Change” and would cover, among others, the following key components: (i) Energy Efficiency in Buildings; (ii) Solar Power Generation with Net Metering; (iii) Hybrid Off-grid Generation; and (iv) Mindanao Mini Hydro Program. While some or all the proposed components will increase energy efficiency, the Solar Power Generation component needs support to transform the existing dynamics: the actors, the economics, the supply chain, and overall, how consumers perceive this technology.

12. The proposed allocation for US\$125 million CTF fund for the energy sector will be used to cover part of the additional cost of solar power generation through large-scale implementation of the net metering program under the new Philippine Renewable Energy Law.

13. As explained earlier, the Philippines Renewable Energy Law with its RPS and Feed-in Tariffs with net metering¹⁷ is a pioneering framework for the entire ASEAN region. This law also provides for establishing a voluntary market for RECs. These provisions will not bear any fruit without appropriate investments in the sector. The ADB will support this market creation opportunity with a government-led project that will quantify the benefits of net metering with solar technology to consumers, establish product quality benchmarks in the market, and develop secondary supply and maintenance chains. Currently the specialized electronic meters (that can record electricity flow in both directions) and solar panels are not readily available in the retail market in the Philippines, and they are controlled by a small number of technology vendors and service providers. A large-scale project will bring in more players and choices to the market and

¹⁷ “*Net Metering*” refers to a system that is appropriate for distributed generation, in which a distribution grid user has a two-way connection to the grid, is only charged for his net electricity consumption, and is credited for any overall contribution to the electricity grid (Source: Section 4 (gg), Philippine Renewable Energy Act of 2008).

improve sector efficiency. CTF is proposed to fund start-up of the net metering program in commercial buildings. CTF cofinancing will accelerate transformation of this market by reducing the time needed to have 30,000 solar generation installations (residential and commercial) from 10 years to about 2 years.

14. Prices for solar panels are relatively high in the Philippines, and only a handful of businesses are actively pursuing the market. Despite the high cost of electricity, customers have not installed distributed solar generation because its high initial capital cost makes it financially unattractive because of long payback periods. The overall installation cost also remained high, since the previous legal framework did not allow selling of excess power back to the grid. Hence, consumers needed batteries for storing excess generation when supply exceeded demand and/or for storing for evening use. In 2009, an average size installation with 4.5 kW installed capacity will cost about US\$18,000 in the retail market, and it will take about 14 years (FIRR: 5.4 percent) to recover the initial amount of the capital cost (US\$18,000) through annual benefits of about US\$1,300. Consumers are unwilling to invest in new technology projects with such long return periods.

15. The net metering provision of the Philippine Renewable Energy Law provides the legal and regulatory enabling environment for significant change in the RE market, but external financing is needed to jumpstart the transformation. Assuming a feed-in tariff 30c/kWh (WACC: 10 percent, depreciation 4 percent, and 4 hours of use each day) for 12 years—as per the provisions of the law—the payback period diminishes to about 10 years (FIRR: 8 percent). This will provide some incentives to large commercial installations and will help the market to grow, but it may take at least five years before the market will reach the threshold where economies of scale and competition will reduce prices. For example, if the local solar generation market were large enough, the competitive price could reduce the payback period to 7.5 years (FIRR: 17 percent).

16. The proposed investment program will (i) reduce the initial capital cost with a large single procurement through international bidding; and (ii) provide additional tariff support above the regulatory feed-in tariff for the first three years to transform this market by accelerating the penetration of solar power in the country. This transformation will target implementation of about 30,000 office buildings, factories, and large houses. The recent price reductions in solar panels and global competition for market share will deliver large discount from bulk procurement. As a result, CTF cofinancing will help reduce the price of the US\$18,000 initial outlay to US\$10,000 (removing the need for battery based storage), and cover a supplement to the net feed-in tariff to the gross amount generated for the first three years of operation (above the fair and reasonable tariff level that would be set by ERC, the regulator), thereby reducing the payback period to about 2.5 years (FIRR: 50 percent). The tariff and payback scenarios are summarized in Table A2-1.

17. Consumers will be made aware of the benefits, favorable pricing, and technical quality of the solar panels. The market will be transformed: the skyline of the city will change as consumers take advantage of this one-time offer. Each panel will also be attached with the REC as allowed under the RE Law, so that retailers will be able to meet the requirements of the RPS using the RECs. RECs may be used by consumers to offset the installation cost of the panels, as

it is commonly used in such countries as Australia.¹⁸ A summary of the various scenarios is shown in Table A2-1.

Table A2-1: Summary of Tariff Incentives and Financial Return

	Baseline	Regulated	Feed-in +	Feed-in + bulk	Feed-in + bulk	Units
		feed-in tariff	bulk purchase	+ CTF incentive	+CTF + REC	
Cost	18,000	18,000	10,000	10,000	10,000	\$
Payback	13.5	9.8	7.5	2.5	2.3	years
FIRR	5.4	8.0	17.4	50.8	64.2	%

18. The ADB will design the MFF to facilitate investment in other sub-sectors and to mobilize private sector investment in EE. CTF will cofinance only the component for solar power net metering that will transform the market and may work with the super ESCO established under the PEEP. The details of this arrangement will be finalized during project preparation.

19. CTF resources are proposed to enhance the MFF investment program design as follows:

- CTF investments will bring down the cost of these technically proven projects through bulk procurement and public awareness “packaging” (described in para 10 above) to be finally and technically viable in the Philippines, reduce payback period for the customers, and increase the credibility of the technology by maintaining (or improving) standards and providing direct incentives to try the new technology.
- CTF resources will cover the additional costs associated with the core investments outlined above and encourage the government to lead and allocate resources for mainstreaming energy efficiency.
- CTF resources will improve the “depth” of the ADB project by increasing the economies of scale and scope for the high-cost investments, which will shorten the payback period and increase the financial rates of return.
- CTF will allow capturing of CDM benefits for all activities, which in turn will reduce the upfront cost because of its scale.
- The proposed market transformational initiative would yield savings to about 30,000 commercial and government offices and large residences in excess of 100,000 tons per year of CO₂ or about 2.5 million tons over the life of the project and costing about US\$50 per ton. It will encourage other customers to switch as the market transforms and the prices fall. This is expected to bring in at least another 300,000 (10-to-1) customers to opt for net metering with RE systems, which will avoid about 25 million tons at a cost just below US\$5 per tons of CO₂.

20. The impact of this investment will be displacement of grid-supplied fossil power with distributed solar power in net metering installations. The project supported by CTF can be replicated and scaled- up as knowledge and operational experience increase. As shown in

¹⁸ Office of the Australian Renewable Energy Regulator, available at <http://www.orer.gov.au/recs/>.

Table A2-2, replication of initial investments could deliver reductions of about 1MtCO₂e per year, representing an aggregate mitigation cost of about US\$5 per ton.

Table A2-2: Summary of Estimated Mitigation Cost-Effectiveness

Component / CTF Contribution	Direct GHG Reduction (tons CO ₂ e per year)	GHG Reduction with Replication and Scale-up (tons CO ₂ e per year)	Net Mitigation cost per ton per CTF (US\$)(
Solar Generation with Net Metering US\$50 million 10,000 units	100,000	25 million	\$5

Implementation Readiness

21. The implementation of the project will be led by the DOE in partnership with other stakeholders, including private sector investors and local government units as appropriate. The DOE has had sufficient expertise to manage the ADB investment project, and project management support will be included in the MFF scope, including capacity building for financial institutions and ESCOs. The preparation stage for the MFF and parallel TA will identify candidate sub-projects partly based on enterprise management capacity to implement the proposed EE investments.

22. The ADB has initiated preparation of the MFF to support the long-term investment program. The ADB will implement a project preparation TA, which will finance initial design of projects for air conditioning upgrades in public buildings, solar net metering in office buildings, and hybrid power generation in Small Power Utilities Group (SPUG) areas. The MFF is scheduled for approval by the ADB’s Board of Directors in 2010. The investments to be supported by CTF will be prepared and approved by year-end 2010, and implementation will begin in early 2011.

Rationale for CTF Financing

23. A combination of factors and constraints are barriers to large-scale EE investment:

- Lack of management and technical expertise to identify new opportunities.
- Perceived financial risk, i.e., payback periods on large capital investments may be in the range of seven to eight years or longer versus less than three years desired by building and plant owners.
- Limited commercial financing for candidate investments.
- *Limited policy support:* energy conservation and EE efforts are essentially “all voluntary” at the moment, with the exception of a more efficient lighting program (supported by the ADB Philippines Energy Efficiency Project). The government is considering a formal policy and/or energy conservation law to create the enabling framework for expanded

conservation and efficiency programs. In the absence of a more formal policy, large-scale EE interventions are clearly not business as usual.

- *Capital cost barriers:* despite long-term cost savings, the proposed investments, such as solar PV and other RE technologies and systems, present a cost barrier to some enterprises. Small- and medium-scale enterprises have limited capital reserves and limited access to commercial financing. Carbon finance may provide some financial support, but revenue would be “on delivery” and not on an upfront basis.
- *Perceived risks:* the energy service company (ESCO) model is in its early operational stages, and is not considered “commercially” proven for purposes of conventional bank financing. Likewise, net metering is a new concept in the Philippines and is not yet being supported by commercial financing. CTF support will help remove “first mover” risk.
- The subprojects supported by CTF are replicable and scalable without long-term concessional financing. As the more efficient building owners’ enterprises gain comparative advantage, intra-sector competition will help drive replication. Commercial financing of EE will also increase as banks and other financial institutions gain experience on the CTF-supported project, and as government-sponsored RE and EE funds are replenished through taxation mechanisms.

Financing Plan

24. The indicative financing plan for the project is shown in the Tables A2-3 and A2-4.

Table A2-3: Financing Plan

	Stage 1	Stage 2	Total: MFF
	(2010–2012)	(2013–2018)	(2010–2018)
ADB	200	200	400
CTF	125		125
Government	50		50
Carbon Finance	50		50
Other Cofinancing		300	300
	425	500	925

25. The indicative processing schedule for the project is shown in Table A2-4.

Table A2-4: Processing Schedule

Milestone	Date
ADB PPTA TA approval	December 2009
Preparation stage	October 2009 – July 2010
Appraisal and negotiations	August – September 2010
Approvals	October 2010
Project completion	December 2015

Annex 3: Urban Transport Program (IBRD)

I. Problem Statement

1. Vehicle ownership in the Philippines has been growing at the rate of 6 percent over the past two decades and is not expected to slow down over the next 10–15 years. Moreover, the urban population in the Philippines is expected to grow by more than 35 million people by 2030. Metro Manila at about 12 million today faces serious congestion, air quality, and traffic safety challenges and is a major contributor to GHG emissions in the Philippines.

2. The transport sector's contribution to Greenhouse Gas (GHG) emissions in the Philippines has increased significantly both in absolute and relative terms since 1990. CO₂ emissions associated with the transport sector have risen from an estimated 6–10 million tons of CO₂ equivalent (MtCO₂e) in 1990 to about 29 MtCO₂e in 2007, an annual increase of about 6–10 percent.¹⁹ Of additional concern is the more than doubling of the relative share of transport in CO₂ emissions from about 15 percent of total emissions (excluding those from land use and forestry) in 1990 to about one-third today.

3. Based on the current growth rates in motorization, emission contributions from road transport, estimated at 24 MtCO₂e in 2007, are projected to increase to 37 MtCO₂e and 87 MtCO₂e by 2015 and 2030, respectively, under a business as usual scenario. This would not only result in a rapid increase in the country's carbon footprint, but would further exacerbate air quality and increase the already high levels of congestion leading to significant losses in productivity.²⁰ To minimize these negative impacts, a concerted effort from both the private and public sectors is required to maximize the modal shift toward mass transit and the use of fuel-efficient vehicles.

II. Proposed Transformation

4. In an effort to reduce the country's carbon footprint and improve air quality, President Gloria Macapagal-Arroyo issued an administrative order in January 2009 instructing transport authorities to develop a NESTS for the country. The administrative order requires DOTC to reform the transportation sector by defining and implementing policies favoring non-motorized transport and mass transport systems, and leading to lower consumption of fossil fuels. In line with this initiative, the first draft of the strategy report was prepared by DOTC in collaboration with the Department of the Environment and National Resources, the Department of Health, and the Department of Energy (DOE) with the assistance of the University of the Philippines' National Center for Transportation Studies. The final draft is expected to be completed by early 2010.

¹⁹ Six MtCO₂e is based on the World Resources Institute's estimates, while 10 MtCO₂e is based on the 2006 IPCC guidelines for estimating fuel emissions.

²⁰ A study prepared by the National Center for Transportation Studies for NEDA and the Legislative-Executive Development Advisory Council in 2000 indicated that losses because of congestion in Metro Manila alone were around 100 billion pesos per year in 1996 prices, about 4.6 percent of GDP.

5. The first draft of the strategy identifies three broad areas where policies could lead to the reduction in GHG emissions (i) the use of alternative fuels following DOE's Alternative Fuels Program (covering bioethanol, biodiesel, natural gas for public transport, and autogas); (ii) enhancing the efficiency of vehicles and tricycles; and (iii) traffic demand management (including BRTs, LRTs, and enhanced public transport planning). A June 2009 study commissioned by the World Bank estimated the potential reductions in GHG emissions that would result from adopting such policies. Using two scenarios, an aggressive-reduction scenario and a medium-reduction scenario, the estimated reductions in GHGs for the year 2020 are 29 MtCO_{2e} and 12 MtCO_{2e}, respectively. By 2030, these reductions would increase to 54 MtCO_{2e} and 28 MtCO_{2e} for the aggressive and medium scenarios, respectively.²¹ This demonstrates the transformational impact that NESTS could have in reducing greenhouse gases.

6. In particular, the successful introduction of BRT systems as part of a well-integrated public transport system in the Philippines, starting with Cebu and followed by Metro Manila, is expected to increase the awareness and acceptance of these systems, as well as the realization of their cost effectiveness and attractiveness. The transformational impact of these mass transit systems lies as much in the reduction of GHGs (estimated at about 2–3 MtCO_{2e} per year) as in their large development potential in providing better and safer mobility, particularly for the poor, a cleaner environment, and increased economic productivity.

7. As far as the direct benefits of the BRT investments proposed for CTF financing in Metro Manila and Cebu City, the expected reduction in GHG emissions in the early years is about 600,000–800,000 tCO_{2e} per year. The gains would be expected to increase as traffic conditions and congestion worsen over time. Moreover, the replication potential is high, since there is low technology risk and substantial private sector interest.

8. The introduction of BRT in Metro Manila and Cebu City is an integral part of the national strategy (NESTS) to improve livability in the cities through better mobility, a reduction in pollution, and an increase in the cities' productivity. This is particularly clear in Cebu City, which has a population of about 900,000 and is served only by an informal public transit system consisting of motorized tricycles, jeepneys, and taxis. The situation is unlikely to improve without the development and implementation of a comprehensive urban transport plan, since most of the economic and land development in Cebu City continues to occur at the city's fringes, particularly in the northeast. This sprawling pattern of urban development will only exacerbate the negative conditions if not promptly addressed.

9. Cebu City has chosen to take an aggressive approach to improve its public transport system and use the inducement of public transport and other traffic management schemes to promote sustainable land use patterns in rapidly urbanizing parts of the city, such as the northeast, as well as in the planned new development in the South Reclamation Project Area.

²¹ Two scenarios are presented in detail in the Section III, on Priority Sectors for GHG Emissions Reduction. The main differences in two scenarios are in the time trajectory for meeting certain targets in a number of areas (biofuel use, asset preservation, inspected vehicles, tricycle conversion from two to four strokes, the deployment of BRT and LRT, and the introduction of traffic management).

10. Similarly in the case of Metro Manila, the proposed BRT is the backbone of integrated public transport plan aimed at enhancing mobility. The plan includes feeder routes, pedestrian and commuter access stations, and terminals, as well as non-motorized transport requirements.
11. Specifically, the proposed CTF cofinanced investments will include the following:
 - a. Investments in about 50 km of BRT systems in three main corridors in Manila and Cebu City, as part of system-wide transformation of urban transport in these cities. The more advanced Corridor in Cebu City could become a model for other BRT systems in the country. Investments will include busways, terminals, stations, control systems, the development of a feeder route system, and pedestrian and commuter access.
 - b. Institutional development to strengthen the capacity of transport officials from DOTC and other major cities in planning for and implementing NESTS and the National Transport Plan (2011–2016) and in general transport planning, regulation, monitoring, and administration.

III. Implementation Readiness

12. As demonstrated in the investment plan, there is strong ownership of the proposed investment interventions by the GOP and the enabling environment to support implementation. Moreover, the Philippines experience in implementing LRT and bus projects demonstrates the capacity of the project management unit to implement the proposed projects.

IV. Rationale for CTF Financing

13. Despite the large development impact of BRTs in these corridors, their high level of GHG reduction, and high replication potential, the lack of knowledge in the Philippines of BRT systems, coupled with the familiarity with the more expensive LRT, has impeded the development of BRTs.

14. In addition, while the investment cost of BRT systems is significantly cheaper than that of rail projects, the costs are still high compared to regular buses and often beyond the financial capacity of local governments with tight budgets and large demands. Carbon finance has not been effective in mobilizing the necessary investments for large-scale emissions in the transport sector.

15. Given that the Philippines is yet to develop a BRT system, CTF financing and support is crucial to help overcome some of the initial financial and institutional barriers and would help demonstrate at scale successful deployment for BRT systems in the Philippines. CTF will help support municipal governments in speeding and scaling up BRT investments. Key to the success of this planned deployment is an enhanced design of the BRT system that is fully integrated into the public transport system. In the case of secondary cities, such as Cebu, the BRT design will be used to influence land use planning and management in an environmentally sustainable manner. This would in turn lead to more BRTs than is currently envisioned as other cities start to recognize their benefits. Emerging metropolitan areas, such as Metro Davao, Naga, Bacolod, Iloilo and Cagayan de Oro, have been identified as potential sites for BRT project implementation.

V. Financing Plan

Source	Total (in Million US\$)
GOP	50
IBRD	250
CTF	50
Total	350

VI. Program Preparation Timetable

Milestones	Dates
Government concept approval and Bank concept review	November 2009
Project preparation	November 2009–June 2010
Appraisal and negotiations	March–June 2010
Approval	December 2010
Project implementation start	March 2011